

Chapter 2

Proposed Action and Alternatives



Overhanging snow and narrow roadway on the Going-to-the-Sun Road west of Logan Pass, 1930s or 1940s

GNPA photo #4824

This chapter describes the alternatives considered for rehabilitation of the Going-to-the-Sun Road. Four alternatives, including a no action alternative, were selected for evaluation. Background information on the alternative development process, design standards for Road rehabilitation, descriptions of each alternative, actions common to all alternatives, alternatives and mitigation excluded from further consideration, and discussion of the environmentally preferred alternative are included in this chapter. A summary table at the end of the chapter compares the environmental impacts for each of the alternatives.

ALTERNATIVE DEVELOPMENT PROCESS

The development of alternatives was a multi-phased and multi-disciplined effort spanning several years and involving input from the public, a CAC, an interdisciplinary team from FHWA and the NPS, and consultants (Washington Infrastructure Services, Coley-Forrest, Renewable Technologies, Inc., ERO Resources, and BBC Research) specializing in highway engineering, transportation planning, economics, natural resources, and cultural resources. Initial alternative development began during the preparation of the Park's GMP. Subsequent alternative development occurred during a 2-year *Engineering Study* (WIS 2001a) and input from the CAC. Based on a review of the alternatives

developed in the *Engineering Study*, the CAC developed and submitted recommendations to the NPS for consideration in the EIS (NPS 2001a).

Following receipt of the CAC's "Final Advice," the NPS initiated a final evaluation and synthesis of alternatives for consideration in the EIS. The NPS reviewed material from the *Engineering Study* and the *Transportation and Visitor Use Study* (WIS 2001a, 2001c) and CAC recommendations to select a full range of alternatives for meeting the project purpose and need. The NPS preferred alternative is Shared Use with Extended Rehabilitation Season (Alternative 3), which is also the alternative recommended by the CAC. A description of all of the alternatives evaluated is included in the remainder of this chapter.

DESIGN STANDARDS FOR ROAD REHABILITATION

Sections 106 and 110 of the National Historic Preservation Act of 1996, as amended, require GNP to undertake planning and actions as may be necessary to minimize harm to the National Historic Landmark-designated Road. The Secretary of the Interior's *Standards for the Treatment of Historic Properties* provide guidelines for promoting responsible preservation practices that would be followed during Road rehabilitation (USDI 1998). The standards that are particularly relevant to the Going-to-the-Sun Road rehabilitation are:

- The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
- Most properties change over time. Those changes that have acquired historic significance in their own right shall be retained and preserved.

- Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
- Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities, and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

Specific treatments for implementation of Secretary of the Interior's *Standards for the Treatment of Historic Properties* would be incorporated into the final engineering and rehabilitation designs. The recently completed *Cultural Landscape Report* (RTI 2002) provides additional treatment recommendations that would be used to implement repairs to historic features.

ALTERNATIVE 1—NO ACTION (REPAIR AS NEEDED)

The No Action alternative maintains the status quo. Rehabilitation work on the Going-to-the-Sun Road would continue as funding allows, but work would be focused primarily on critical and emergency repairs without substantial long-range planning. Implementation of needed Road repairs would take about 50 years under current and anticipated levels of funding. This alternative would not meet NPS goals and objectives for rehabilitation of the Road nor would it prevent further loss of natural, historic, and cultural resources, or address potential safety issues.

The Repair as Needed alternative provides for only the basic operation and maintenance of the Road.

There would be no major Park focus on preventative maintenance actions such as wall maintenance or crack sealing. As the Road and its structures approach failure, critical repairs would be made within the constraints of available funding and resources. Planning and design would be limited to the immediate project area, and would be based on priority or critical sections established by Park operation and maintenance personnel and FHWA. When repairs are necessary, work forces would be engaged to provide the best repair within available funding. A traffic design and traffic management plan would be established for the specific repair site. The use of specialized techniques, such as prefabrication, would not be cost or time effective for small repairs. The costs and efficiency of repairing failed sections of roadway on a piecemeal or emergency basis would be substantially higher compared with larger scale rehabilitation work.

Scheduling and Funding

Rehabilitation of the Road under the No Action alternative would take about 50 years; thus, the Road would be under a constant state of construction. The NPS would compete for annual funding through the current FHWA/NPS Park Road Program and it is anticipated that on average, \$1 to \$2 million dollars per year would be available for Road rehabilitation. The total estimated cost over the 50-year period of construction would range from \$328 to \$394 million (Table 2). The cost for minor visitor use improvements is included with the estimated cost for Road rehabilitation. Funding for road maintenance would remain at about \$560,000 per year.

Traffic Management

It is anticipated that the Road would remain open during rehabilitation work, subject to traffic delays; however, traffic control requirements, and consequently traffic delays, are dictated by the problem and repairs needed. A maximum cumulative delay of 30 minutes would be allowed when traveling over the length of the Road for most repairs, but longer delays may be necessary if damage is extensive (Table 2). Night work is possible depending on the conditions and the type of repairs. Rehabilitation work would be conducted from spring until fall subject to weather and safety considerations.

Transit Service During Rehabilitation

Transit service would not be expanded above current operations. A private concessioner would continue to operate two transit vehicles, with service between West Glacier and St. Mary from Independence Day through Labor Day. Existing service operates as a two-way loop system with transit intervals between 2 and 5½ hours. Available funding would be directed only to Road rehabilitation work, not to additional transit service.

Operations and Maintenance

The Repair as Needed alternative does not provide a means for establishing an effective long-term maintenance program. Existing funding for Road maintenance would not increase and Road repairs would not keep up with Road deterioration. Operation and maintenance efforts would remain focused on spring snow clearing and the most critical repairs within budget constraints.

Table 2. Comparison of alternative features.

Action	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
SCHEDULE				
Road rehabilitation duration	50 years	20 years	7 to 8 years	6 to 8 years
FUNDING (millions of dollars)				
Road rehabilitation cost	\$98 - \$117	\$90 - \$107	\$81 - \$108	\$72 - \$84
Visitor use improvement cost	0	\$1.5	\$10	\$10
Total transit system cost over rehabilitation period	0	\$8.7	\$5.5	\$8.2
Visitor development mitigation	0	0	\$17	\$17
TOTAL COST				
• 2001 dollars	\$98 - \$117	\$100 - \$117	\$113 - 140	\$107- \$119
• Inflation adjusted (4%/year)	\$328 - \$394	\$157 - \$186	\$140 - \$170	\$126 - \$144
Yearly funding required	\$1 - \$2	\$5	\$10 - \$23	\$9 - \$20
Annual road operation and maintenance cost following rehabilitation	\$0.56	\$1.5 - \$1.9	\$1.5 - \$1.9	\$1.5 - \$1.9
TRAFFIC MANAGEMENT ON THE GOING-TO-THE-SUN ROAD DURING REHABILITATION				
Up to 30-minute delays, everyday, all season	Yes	Yes	Yes	Yes
Up to 1-hour delays	No	No	Mornings ¹ and evenings ² (Monday through Thursday)	No
Up to 2-hour delays	No	Nights ³ (Sunday through Thursday)	No	No
Up to 4-hour delays	No	Nights ³ (Monday through Thursday) after third Monday in September	Nights ³ (Monday through Thursday)	No
Traffic suspensions on road segments under rehabilitation	No	No	Prior to Independence Day and after mid-September	Monday through Thursday, all season
Access to Logan Pass	Yes	Yes	Yes	Yes
¹ Mornings = 8 A.M. to 10 A.M. ² Evenings = 3 P.M. to 8 P.M. ³ Nights = 8 P.M. to 8 A.M.				

Action	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
TRANSIT SERVICE DURING REHABILITATION				
Schedule	Existing operation, 2½ to 5 hour intervals	Existing operation, 2½ to 5 hour intervals plus destination transit	60-minute intervals	30-minute intervals
Vehicles — vans or buses	3 (2 active; 1 backup)	5 (4 active; 1 backup)	7 (6 active; 1 backup)	14 (12 active; 2 backups)
New transit staging areas	No, existing parking areas would be used	Same as Alternative 1	Staging area parking at Apgar (25 to 30 spaces) and St. Mary (10 to 15 spaces)	Staging area parking at Apgar (55 to 60 spaces) and St. Mary (25 to 30 spaces)
Shoulder season service	No	No	Yes	Yes
OPERATIONS AND MAINTENANCE				
Increased annual funding for operations and maintenance	No	Yes	Yes	Yes
VISITOR USE IMPROVEMENTS				
Parking and Pullouts				
Move, add, or reconfigure parking and pullouts to improve safety and traffic flow	No	No	Yes	Yes
Remove or formalize social pullouts	No	Yes	Yes	Yes
Add slow-moving vehicle pullouts	No	Yes	Yes	Yes
Vegetation Management				
Vista and roadside vegetation clearing	Yes	Yes	Yes	Yes
Trail Improvements				
Rehabilitate existing roadside trails and add new short trail segments	No	No	Yes	Yes
Toilets				
Rehabilitate existing vault toilets	No	Yes	Yes	Yes
Replace portable toilets with vault toilets and add new toilets	No	Yes	Yes	Yes

Action	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
Visitor Orientation, Information, and Interpretation				
Install orientation and information facilities	No	No	Yes	Yes
Provide interpretive wayside exhibits along the Road	No	No	Yes	Yes
Develop Intelligent Transportation System, update roadside signage, and provide communication material to visitors	No	No	Yes	Yes
Activate public information program to aid visitors and local businesses	Yes	Yes	Yes	Yes
Implement visitor use mitigation measures	No	No	Yes	Yes

Visitor Use Improvements

Developments associated with visitor use improvements would be minor. Existing roadside social pullouts either would be revegetated or formalized to improve safety and protect resources. During rehabilitation work, the Park would implement a public information program to alert visitors to Road conditions and delays. Roadside vegetation clearing would be conducted to improve scenic vistas. Maintenance and upkeep of existing facilities would continue under current levels of funding.

Mitigation

No additional mitigation measures other than those described as common to all alternatives later in this chapter would be implemented.

ALTERNATIVE 2—PRIORITY REHABILITATION

Priority Rehabilitation allows for planning and design of work ahead of time, rather than in response to road failure or emergency repairs. Advanced planning ensures that historic and cultural resources, environmental and socioeconomic concerns, and operations and maintenance issues are addressed, but implementation of Road repairs over 20 years would not prevent continued deterioration of these resources. Available funding would focus on Road rehabilitation and few improvements to visitor use facilities would be implemented. The addition of two transit vehicles would provide visitors with another travel option during construction. The Priority Rehabilitation alternative requires that individual site rehabilitation designs and traffic management plans are prepared using an established

list of priorities. Data collection and final engineering design would be conducted in advance of funding determinations to allow for rapid implementation of needed repairs. Designs and plans would be implemented based upon their priority or as emergencies arise, and as funding is appropriated.

Priority Rehabilitation allows for more planning and impact mitigation than Alternative 1. As a result, there is an opportunity to use specialized techniques, such as prefabrication, to slightly improve construction efficiency and cost. Construction staging would occur at designated sites within and outside the Park. Although this alternative establishes a plan for rehabilitation, because of its duration there is still a significant potential for major road failure that would require emergency repairs and traffic delays or road closure.

Scheduling and Funding

Rehabilitation of the Going-to-the-Sun Road under the Priority Rehabilitation alternative would take about 20 years. The cost to implement this alternative, including minor visitor use improvements and small-scale expansion of the transit system would range from \$157 million to \$186 million and average annual funding of about \$5 million would be required (Table 2). Operation of five transit vehicles over the 20-year rehabilitation period would cost about \$8.7 million. Because of the expense to implement the proposed rehabilitation of the Going-to-the-Sun Road, GNP would seek special designation to provide funding under the reauthorization of TEA-21 (2004-2009).

Additional funding is needed in order to upgrade the level of operation and maintenance activities. Currently the Park does not have adequate maintenance funding to keep up with annual damage to the Road, and prevent further deterioration.

Implementation of proposed Road improvements would necessitate an annual operating and maintenance budget of \$1.5 million to \$1.9 million per year to protect the capital investment in Road rehabilitation and assure public safety and resource protection following rehabilitation. GNP will seek additional funding specifically dedicated to operation and maintenance. One option the CAC suggested is the establishment of a permanent “maintenance endowment fund” separate from the Park budget that could be used exclusively for Road maintenance.

Traffic Management

Advanced planning would allow preparation of a site-specific traffic management plan to reduce visitor delays and more efficiently conduct rehabilitation work. Traffic management under the Priority Rehabilitation alternative would be similar to that currently used for on-going critical repair work. This alternative emphasizes weekday construction, with limited weekend work. A maximum cumulative delay of 30 minutes would be allowed when traveling over the length of the Road (Table 2). This may include a combination of short stops at multiple construction sites. Two-hour delays would be allowed at night between 8 P.M. and 8 A.M., five days a week (Sunday through Thursday). Beginning the third Monday in September, when visitation is lower, traffic delays of up to 4 hours could occur Monday through Thursday between 8 P.M. and 8 A.M.

Night construction (between the hours of 8 P.M. and 8 A.M.) would be used as appropriate depending on the type of work and safety considerations. Work at night is most likely to occur at lower elevation sites where efficiency is greater and there are fewer safety concerns. Seasonal visitor access to the Road would remain the same as current operations. The Road

would open to visitors in the spring following snow removal and extend through the third Monday in October. Rehabilitation work would continue from spring to fall as weather conditions permit.

Transit Service During Rehabilitation

Transit service during rehabilitation would be similar to existing conditions plus two new transit vehicles would be added to the existing transit vehicles to provide destination transit service to specific locations for tours or interpretive and educational programs. A total of four active transit vehicles and one backup vehicle would be available for this alternative. Transit service would allow users several options to access various popular destinations along the Road. Existing visitor staging areas at Lake McDonald Lodge and the St. Mary Visitor Center would be used. The NPS will be examining fares and possible subsidies to provide reasonably priced transit service for visitors.

Operations and Maintenance

The Park currently has an operations and maintenance plan (NPS 1993b) and will be updating the plan over the next several years. An expanded operations and maintenance program would allow the Park to maintain the roadway in a manner that protects the structure and integrity of the Road, avoids or minimizes damage to natural resources, maintains or improves roadside safety, protects cultural resources, and recognizes the importance of the visitor experience.

Visitor Use Improvements

Several improvements to visitor use facilities would be implemented under Alternative 2. No improvements in parking, major pullouts and

overlooks, or other facilities would be implemented. Slow-moving vehicle pullouts would be added to about three locations on the west side of the Park, and two to three locations on the east side at lower elevations (Figure 7). These pullouts would be about 120 feet (40 meters) in length and would allow slow vehicles to pull over. Roadside vista clearing would be used to restore scenic views. Existing toilets would be rehabilitated and portable toilets would be replaced with vault toilets. New toilets would be added to the Transit Center, pullout #8, Avalanche, Logan Pit, the Loop, Big Bend, Logan Pass, and the St. Mary Falls Trailhead. Existing toilets would be upgraded and ADA accessibility would be improved at all sites. The Park would activate a public information program similar to the current one to inform visitors about ongoing roadwork.

Mitigation

No additional mitigation other than that described as common to all alternatives would be implemented.

ALTERNATIVE 3—SHARED USE WITH EXTENDED REHABILITATION SEASON (PREFERRED)

Alternative 3, Shared Use with Extended Rehabilitation Season (Shared Use), is the NPS' preferred alternative. This alternative balances rehabilitation requirements while maintaining visitation similar to current conditions. Roadwork would be conducted throughout the visitor season, but work that requires substantial traffic delays would be conducted during the spring and fall shoulder seasons, which are times of low visitor use. This alternative would complete Road repairs in 7 to 8 years to prevent further deterioration to historic,

cultural, and environmental resources. Alternative 3 also implements expanded transit service during rehabilitation and visitor use improvements to upgrade facilities and address safety concerns.

This alternative includes all of the rehabilitation work necessary to correct deficiencies in the Going-to-the-Sun Road. Advanced planning would allow rehabilitation designs to address all of the engineering, cultural, environmental, socio-economic, and long-term operations and maintenance considerations. The Shared Use alternative allows for improvements in efficiency and cost effectiveness of rehabilitation work by use of flexible traffic management strategies and concentrating work efforts over a shorter period than Alternatives 1 and 2.

Scheduling and Funding

Rehabilitation of the Going-to-the-Sun Road under the Shared Use alternative would take from 7 to 8 years to complete. The cost for implementing repairs, including visitor use improvements, transit service during rehabilitation, and mitigation measures, would range from \$140 million to \$170 million (Table 2). Annual funding of \$10 to \$23 million per year would be needed.

Implementation of expanded transit service would cost about \$5.5 million during the rehabilitation period. The current transit program is operated by a private concessioner who charges riders a fee and who is not subsidized by the Park. Expansion of the transit system during rehabilitation would increase transit operating costs. The current range of fares is too low to cover the projected operating costs and a substantial increase in fares may be more than visitors are willing to pay. The NPS will be examining fares and possible subsidies to provide reasonably priced opportunities for transit service. Possible options include increasing transit fees by a

nominal amount or increasing visitor entrance fees to cover a portion of the cost of transit operation. Additional funding also would be needed for the capital necessary to purchase the vehicles, signs, and other transit-related expenses. Funding sources for transit may include special federal appropriations, sponsors, local cities, and the Montana Department of Transportation. If subsidized funding or other revenue sources are not secured, an expanded transit system may not be feasible. Additional long-term expansion of transit service within the Park and connections with local and regional transit service would be addressed in the future.

Implementation of visitor use improvements including parking and pullout improvements, new and rehabilitated toilets, trails work and improved visitor information services would cost about \$10 million.

Additional visitor use and socioeconomic mitigation measures are proposed as part of the Preferred alternative to minimize impacts associated with rehabilitation work. Proposed measures include construction of the West Side Discovery Center near Apgar, rehabilitation of the St. Mary Visitor Center, and implementation of an Intelligent Transportation System. The cost for these actions is approximately \$17 million.

Funding for operations and maintenance of the Road following rehabilitation would be about \$1.5 to \$1.9 million per year. During rehabilitation, funding for operation and maintenance would need to increase incrementally as roadwork is completed.

Traffic Management

Traffic management would be scheduled to minimize visitor impact during rehabilitation. This would require balancing the needs of the rehabilitation contractor, who needs good access and

a realistic work schedule to efficiently complete the work, with strategies to maintain visitor traffic flow and access to the Going-to-the-Sun Road. This would require careful planning and staging of construction activities using a combination of short traffic delays during peak visitor times, night work, and rehabilitation work during the shoulder seasons in the spring and fall. Rehabilitation work requiring longer visitor delays would be conducted at night or during the shoulder season in the spring and fall. A plan for visitor orientation and informational services would guide the overall development of facilities to advise the public on options and alternatives, both before their visit and during their stay.

Traffic management strategies for the Shared Use alternative include a maximum cumulative delay of 30-minutes over the length of the Going-to-the-Sun Road, with a combination of several short delays at multiple construction sites. These short delays would occur during peak visitor hours throughout the week. Up to 1 hour of cumulative delays over the length of the Road are possible during non-peak hours in the mornings (8 A.M. to 10 A.M.) and evenings (3 P.M. to 8 P.M.), Monday through Thursday. Longer traffic delays up to 4 hours would occur at night between 8 P.M. and 8 A.M. from Monday through Thursday, primarily at lower elevation sites.

Visitor access along the Going-to-the-Sun Road would remain open throughout the peak visitor season from Independence Day (July 4) to mid-September. An extended rehabilitation season would be used to concentrate work efforts in the shoulder season in the spring and fall when Park visitation is low, prior to Independence Day and after mid-September. Motor vehicle, bicycle, and pedestrian access to the Road during the shoulder season would remain open except for those areas that are under construction. At least 80 percent, or

about 40 miles (65 kilometers), of the Road is expected to remain open during the shoulder season. Although the open sections would not be contiguous, Logan Pass would remain open throughout the normal visitor season; however, during the shoulder season, access would only be available from one side of the Park.

Transit Service During Rehabilitation

Expanded transit service would be implemented as a mitigation measure during construction to facilitate visitor access along the Going-to-the-Sun Road. The number of transit vehicles would be increased from the two that are currently used to a total of six active vehicles and one backup vehicle. This does not include the Red Bus tours that currently operate independent of the transit system. Transit vehicles would operate in both directions along the Road at 60-minute intervals during the peak visitor season. The transit system would operate with either 15-passenger vans, or a 25-passenger bus or other vehicle suitable for the narrow roadway. Transit stops would be developed at the major trailheads and key visitor attractions. On the west side, a new transit parking area would be located near Apgar at the site of the planned West Side Discovery Center. On the east side, existing parking at the St. Mary Visitor Center would be reconfigured to accommodate parking for visitors using the transit system.

Operations and Maintenance

Expanded operations and maintenance measures would be implemented for the Shared Use alternative as described for Alternative 2. This includes funding to keep the Road in good condition and prevent deterioration of roadway structures and historic features following completion of rehabilitation work.

Visitor Use Improvements

Alternative 3 provides an opportunity to incorporate needed improvements to visitor use facilities adjacent to the Road. Many of the improvements are linked with rehabilitation of specific roadway segments and would be implemented during work on a particular Road segment. All improvements would be located within the visitor service zone encompassing the Road and adjacent visitor use facilities. Visitor use improvements include upgrades in parking areas and pullouts, vista and roadside vegetation clearing, formalizing roadside social trails and creation of new trails, and improvements to toilets. Increased levels of interpretation and orientation information for visitors would be added to all visitor use improvement sites. Visitor use improvements are described in detail below.

Parking and Pullouts

Upgrades to existing parking and pullouts adjacent to the Road are proposed to comply with life safety and accessibility codes and standards, improve vehicle and pedestrian circulation, provide parking for public tours, and prevent damage to resources (Table 3). One new visitor use pullout with parking is proposed at the Baring Creek Cabin Trailhead. This new facility is needed to relieve congestion and improve safety. As mentioned for Alternative 2, pullouts for slow-moving traffic would be added at three locations on the south side of the Road (near MPs 7.5, 12, and 20) to improve safety and traffic flow (Figure 7). Similar slow-moving vehicle pullouts would be added at two or three locations on the east side of the Park between Siyeh Bend and Rising Sun. The remainder of pullout improvements occur at existing locations (Figure 7). Upgrades include defining parking spaces, improving vehicle and pedestrian circulation, rehabilitating trails,

adding transit stops, rehabilitating or adding toilets, and installing exhibits and interpretive information. Historic scenic vistas would be restored at several sites following guideline in an overall Vista Management Plan. Historic scenic vistas would be restored at several sites following guidelines in an overall Vista Management Plan. Accessibility codes and standards would be addressed. Other minor improvements to existing unnamed pullouts, such as vegetation clearing or the addition of interpretive exhibits, would occur throughout the Road corridor. Approximately 15 gravel pullouts would either be paved or reclaimed.

Apgar. The Apgar Village area is located just off the Camas Road near the intersection with the Going-to-the-Sun Road. Proposed improvements for this area associated with Road rehabilitation include adding a designated transit stop, improving vehicle and pedestrian circulation, and providing visitors with information and orientation material. These improvements would be located within existing parking areas or other developed sites.

West Side Discovery Center/Transit Center. As previously described for transit service, a new transit staging area and parking facility would be located near Apgar at the planned location of the West Side Discovery Center. The parking facility under Alternative 3 would be about 2 acres (0.8 hectares) in size to accommodate 25 to 30 parking spaces. A new toilet would be added to this location as well as information services for visitors.

Lake McDonald Lodge. Improvements at Lake McDonald to aid visitors include the designation of a transit stop within the existing parking lot and a location to provide orientation and information material for visitors. No new disturbance is needed for these improvements.

Pullout #8/Road Camp. A new vault toilet would be installed at this existing pullout along with improved orientation and information material. A new short (300-foot; 100-meter) trail would be constructed to provide access to the nearby historic Road Camp and adjacent forest. Total new disturbance at this site is estimated to be about 0.2 acres (0.08 hectares).

Avalanche. A number of improvements have been considered in the Avalanche area to improve the quality of visitor facilities at this popular location. Only minor improvements to existing facilities are proposed for Alternative 3 as described below. The NPS will be developing additional rehabilitation plans for the Avalanche area in the future to address other needed improvements.

Proposed improvements include conversion of the NPS residence in the campground to a toilet facility and rehabilitation of the existing picnic area toilet. A roadside transit stop would be designated along with visitor access to Intelligent Transportation System (ITS) information. Additional visitor information, orientation, and interpretive information would be provided. The existing Trail of the Cedars would be rehabilitated including improved information and interpretive exhibits. A footbridge across Avalanche Creek would be constructed to provide access from the existing parking area to the Trail of the Cedars. Visitor use improvements would be confined primarily to previously disturbed areas, but up to 0.1 acres (0.04 hectares) of new disturbance is possible.

Red Rock Point. This existing roadside pullout is a popular location for visitors to access McDonald Creek. Improvements in vehicle and pedestrian circulation would be implemented within the existing parking area. Information and interpretive materials would be provided for visitors. Existing social trails to the creek would be rehabilitated and a

300-foot (100-meter) defined formal trail would be established to reduce resource damage. Less than 0.1 acres (0.08 hectares) would be disturbed at this site.

Logan Pit. To reduce traffic congestion at Avalanche and improve safety for motorists and pedestrians, the oversized vehicle turnaround would be shifted from Avalanche to Logan Pit. Due to road width, vehicles over 21 feet (6.4 meters) long or 8 feet (2.4 meters) wide are not permitted on the narrow upper portion of the Going-to-the-Sun Road. Currently, oversized vehicles must turn around at the Avalanche picnic and campground area, which compounds current traffic congestion. This action would not be implemented until rehabilitation work on the west side is complete because Logan Pit would be used for construction staging during rehabilitation. Other improvements for this site include parking, a transit staging area, a new toilet, and short sidewalks to connect these facilities. Visitor information and materials would be provided at this site. No new disturbance would be needed to implement these improvements.

Logan Creek. The existing small parking area and vault toilet would be rehabilitated at this site. Visitor safety and access would be addressed by improvements in vehicle and pedestrian circulation. Existing social trails would be rehabilitated and a single formalized short trail constructed. Visitor information and materials would be provided at this site. About 0.1 acres (0.04 hectares) of new disturbance would occur from implementation of these improvements.

The Loop. Proposed improvements to The Loop include reconfiguration of the parking area to improve safety. A crosswalk would be added to provide safe access to the Highline Trailhead located outside of the hairpin corner. Historical viewing and interpretive areas in the center of The Loop would

be maintained by selective clearing of vegetation. The pedestrian overlook along the outside of the lower Road would be formalized to provide a safe area for scenic viewing following vista clearing. A permanent toilet would be added to the lower section of The Loop switchback, replacing the existing portable toilet. Included within the reconfigured parking area are separate east- and west-bound transit stops, visitor information, and interpretive material. No new disturbance is anticipated for these improvements.

Road Camp. The existing parking area at this pullout would be modified to improve safety by separating vehicle and pedestrian traffic. The existing trail and stone steps would be rehabilitated and a small viewing platform constructed and interpretation added. Selective vegetation clearing would restore the scenic vista. About 0.03 acres (0.01 hectares) of new disturbance would be needed to implement these improvements.

Big Bend. The Big Bend pullout provides an opportunity to improve the variety and quality of the visitor experience. Proposed improvements include construction of a retaining wall along the existing fill slope to provide room for formalized parking spaces and improved vehicle and pedestrian circulation. East- and west-bound transit stops would be incorporated into the pullout design. Social trails below the parking area would be formalized to reduce impacts to vegetation and provide visitors with a short scenic hike away from the Road. A toilet would be added and a removable kiosk and interpretive exhibits would provide information about the Park. About 0.2 acres (0.8 hectares) of new disturbance would occur with these improvements.

Oberlin Bend. The existing accessible trail at this pullout would be rehabilitated. Interpretive exhibits would be installed along the trail. No new

disturbance would be needed to implement these improvements.

Logan Pass. This parking area and visitor center is located at the top of the Continental Divide. During the peak visitor season in the middle of the day, it is difficult to find a parking space. ITS and transportation options will be explored during construction to help alleviate this problem. A transit stop would be designated within the existing parking lot. Logan Pass will always be open to visitors during Road rehabilitation. The existing portable toilets would be replaced with new vault toilets. Additional interpretive and informational materials would also be added. No new ground disturbances would be needed to implement these improvements.

Lunch Creek. Visitor safety would be improved at this existing pullout by separating vehicle and pedestrian circulation. Information and interpretive materials would be added. Approximately 300 feet (100 meters) of the existing social trail would be rehabilitated to provide a formal trail and the remaining trails removed and revegetated. About 0.1 acres (0.04 hectares) would be disturbed implementing trail improvements.

Siyeh Bend. Vehicle parking and pedestrian circulation would be improved at the existing Siyeh Bend pullout. Separate east- and west-bound transit stops would be constructed. A pedestrian walkway and crosswalk for trailhead access would be installed along with rehabilitation of existing trails. New disturbances of up to 0.1 acres (0.04 hectares) would occur with proposed improvements.

Jackson Glacier Overlook. This existing pullout serves as a trailhead for Gunsight Pass and is a popular scenic stop. Vegetation clearing would be conducted to maintain the scenic vista. Pedestrian and vehicle circulation would be separated and a designated transit stop established. Visitor information and orientation material would also be

provided at this site. No new disturbance would be needed

Grizzly Point. To improve visitor safety at this existing pullout, the site would be reconfigured to separate vehicles and pedestrians. The scenic view would be restored by clearing vegetation adjacent to the pullout. Information and orientation materials would be incorporated into the design of the pullout. No new disturbance would be needed to implement these improvements.

St. Mary Falls Trailhead. Improvements at this popular trailhead are needed to meet safety standards. The depth of the parking area would be expanded and a retaining wall constructed to provide the necessary distance from the Road for safe vehicle entry and exit. This would allow separation of vehicle and pedestrian circulation. A new toilet would be added to this site. A transit stop and information and orientation materials would be incorporated into the trailhead improvements along with rehabilitation of the existing trail. Vegetation clearing would be conducted to improve the scenic vista. About 0.1 acres (0.04 hectares) of new disturbance would occur at this site.

Sunrift Gorge. The Sunrift Gorge pullout provides access to a popular trailhead and the scenic Sunrift Gorge. Parking for visitors would be improved by eliminating unsafe parking areas from the north side of the road and formalizing parking and pedestrian circulation. East- and west-bound transit stops would be incorporated into the pullout. The existing walkways to the area under the bridge and the Sunrift Gorge viewing area on the north side of the Road would be reconstructed to improve pedestrian safety. Information and interpretive material would be added. No new disturbance would be needed to implement these improvements.

Baring Creek Cabin Trailhead. Proposed improvements for this location include relocating the

Siyeh Trailhead to the east a short distance and creating a new roadside parking area specifically for trailhead parking. This would reduce traffic congestion and free up parking space for short-term visitors at Sunrift Gorge. The new trailhead parking area would accommodate about 15 to 20 vehicles and would require construction of several short sections of new trails to link the parking area with the Siyeh, Sun Point, and St. Mary trails. A transit stop would be included at this site along with interpretive information. Implementation of these improvements would disturb about 0.5 acres (0.2 hectares) of land.

Sun Point. Sun Point is an existing large parking area with picnic facilities, a vault toilet, and trailhead. Several improvements are proposed for this location following use of the area for construction staging. Interpretive exhibits would be added to provide information to visitors. Sun Point would continue to provide RV parking and serve as the oversized vehicle turnaround. A transit stop would be installed in the existing large capacity parking lot. Scenic vistas would be restored by selective vegetation clearing. The toilet would be rehabilitated. Improvements would be located within the existing areas of disturbance.



Information station at Sun Point, August 1951

Photo by D.H. Robinson, GNPA #5882

Wild Goose Island Overlook. Parking and safety improvements at the Wild Goose Island Overlook would require a slight shift in the Road alignment so that all parking sites are located on the south side of the Road. This would eliminate the need for pedestrians to cross the Road to access the overlook. The parking lot east of the overlook would be eliminated and the parking area located west of the overlook would be removed and revegetated. Social trails at the overlook would be formalized to provide multiple viewing locations and to reduce resource damage. A transit stop and interpretive information would be added. Scenic views would be restored by clearing vegetation. Total new disturbance for improvements to the Wild Goose Island Overlook would be about 0.75 acres (0.3 hectares). The abandoned parking area (0.1 acres; 0.08 hectares) would be removed and restored with native vegetation.

Rising Sun. Improvements at this location include the designation of a transit stop and additional information and interpretive materials. All improvements would be located within existing developed areas.

St. Mary Entrance and Visitor Center. The entrance station would be rehabilitated to meet building and accessibility codes and standards. A new information orientation pullout (5 to 7 vehicles) with information and orientation materials similar to the recently completed West Entrance orientation pullout would be constructed just west of the entrance station. The St. Mary Visitor Center (exhibits, audiovisual, etc) would be rehabilitated as part of the mitigation program. Access to the parking areas and visitor staging for transit service would be improved. About 0.2 acres (0.08 hectares) would be disturbed to implement these improvements.

Trail Improvements

A total of about 1 mile (1.6 kilometers) of new short trail segments would be located adjacent to the Road. These roadside trails would connect existing Park facilities and provide access to features or attractions where feasible. Other trailheads and social trails where resource damage has occurred near pullouts and parking areas would be rehabilitated, protected, or restored.

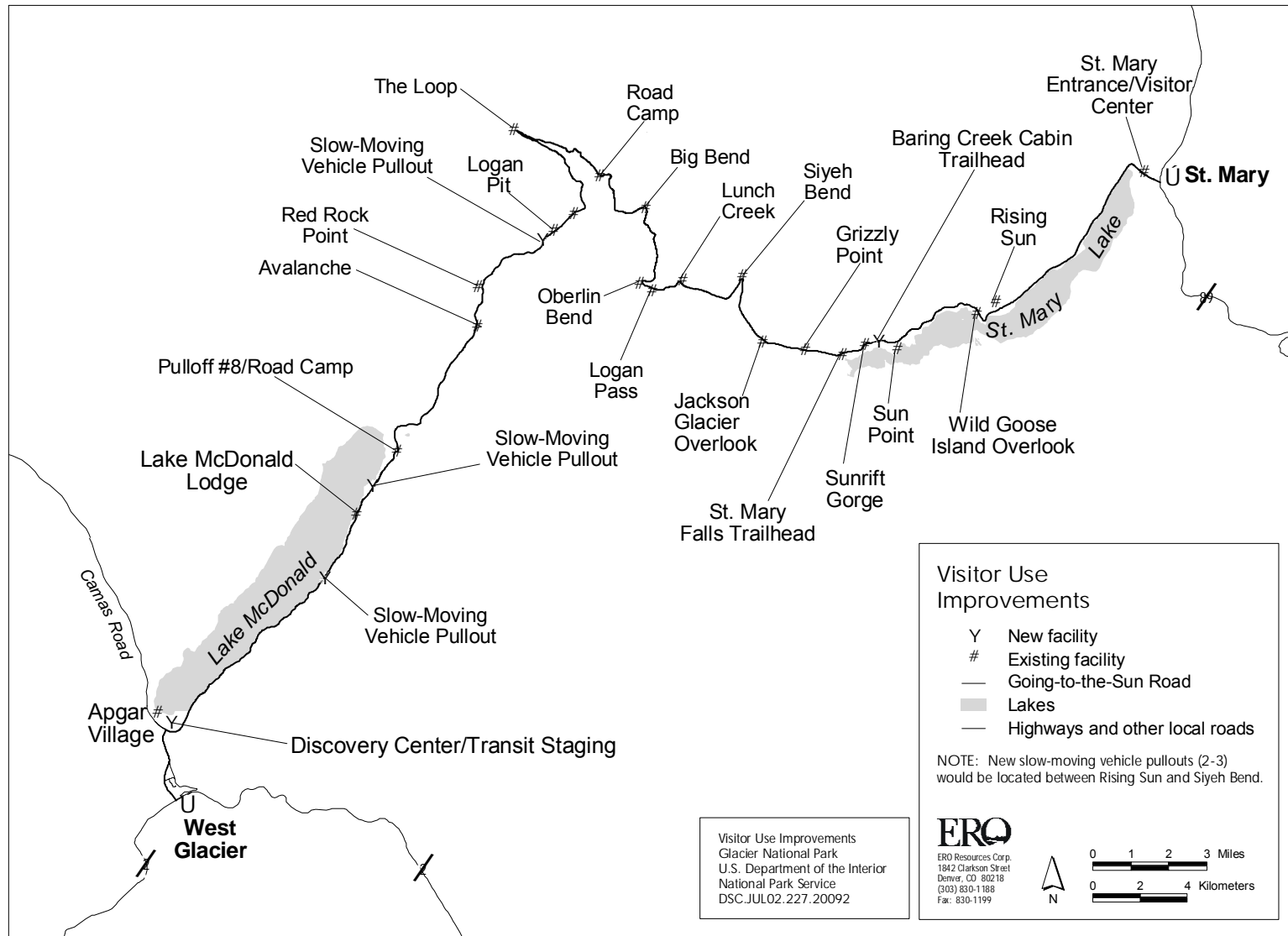
Visitor Orientation, Information, and Interpretation

A variety of orientation, information, and interpretive measures would be implemented to improve the quality of the visitor experience both during and after Road rehabilitation. Proposed improvements in visitor communication include new orientation stations, information kiosks, interpretive exhibits, additional signs, and an ITS.



Exhibit along Going-to-the-Sun Road

Figure 7. Visitor Use Improvements.



CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES
GOING-TO-THE-SUN ROAD REHABILITATION PLAN/DRAFT ENVIRONMENTAL IMPACT STATEMENT

Table 3. Visitor use improvements along the Going-to-the-Sun Road included in Alternatives 3 and 4.

Location →	Apgar	Discovery/Transit Center	Lake McDonald Lodge	Pull off #8 / Road Camp	Avalanche	Red Rock Point	Logan Pit	Logan Creek	The Loop	Road Camp	Big Bend	Oberlin Bend	Logan Pass	Lunch Creek	Siyeh Bend	Jackson Glacier Overlook	Grizzly Point	St. Mary Falls Trailhead	Sunrift Gorge	Baring Creek Cabin Trailhead	Sun Point	Wild Goose Island Overlook	Rising Sun	St. Mary Entrance and Visitor Center
Improvement ↓																								
Improve Vehicle Parking & Pedestrian Circulation	X					X		X	X	X	X			X	X	X	X	X	X		X	X		X
Provide New Pulloff or Parking		X					X													X				X
Realign Road & Reconfigure Parking																						X		
Improve Site for Oversized Vehicle Turnaround							X														X			
Upgrade Entrance Area																								X
Improve Information, Orientation, and/or Interpretation (Including ITS)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Improve Vistas									X	X						X	X	X			X	X		
Rehabilitate Toilet					X			X													X			
Replace Portable Toilet with New Toilet									X				X											
Provide New Toilet		X		X	X		X				X							X						
Provide or Reconfigure Area for Transit Stop	X	X	X		X		X		X		X		X		X	X		X	X	X	X	X	X	
Improve Site For Visitor Staging		X					X														X			X
Rehabilitate Trail/Walks					X	X		X		X		X		X	X			X	X		X	X		
Provide New Trails/Walks				X			X				X									X				
New Disturbance [‡]																								
Acres	*	2-4 [†]	*	0.2	0.1	0.1	*	0.1	*	0.03	0.2	*	*	0.1	0.1	*	*	0.1	*	0.5	*	0.75	*	0.2
Hectares	*	0.8-1.6	*	0.08	0.04	0.04	*	0.04	*	0.01	0.08	*	*	0.04	0.04	*	*	0.04	*	0.2	*	0.3	*	0.08

*No or incidental new disturbance outside of existing facility.

[†]Alternative 3 would disturb 2 acres (0.8 hectares); Alternative 4 would disturb 4 acres (1.6 hectares).

[‡]A total of about 4.5 acres (2 hectares) would be disturbed for visitor use improvements under Alternative 3. Under Alternative 4, a total of about 6.5 acres (3 hectares) would be disturbed.

Orientation Stations and Information Kiosks. An orientation station would be located near the East Entrance Station of the Going-to-the-Sun Road in a roadside pullout to assist visitors when they enter the Park. Information kiosks would be located at several popular visitor use sites such as major trailheads, staging areas, and visitor centers. Orientation stations and information kiosks would provide information on Park features and attractions, schedules for educational programs or tours, special events information, and updates on rehabilitation work and traffic delays. The stations may be equipped with interactive real-time computer terminals to answer questions and provide recommendations about specific times of day to see attractions, avoid crowds, and experience the Park.

Interpretive Wayside Exhibits and Signage. Exhibits would provide site-specific interpretive and educational information to enhance the visitors understanding of Park natural, cultural, and historic resources. Interpretive exhibits may include information on geologic features, wildlife, ecosystems, and history. Exhibits also may be used to explain the history of the Going-to-the-Sun Road construction and the planned rehabilitation work to restore damaged sections of the Road. Wayside interpretive exhibits may be installed at locations such as Avalanche, Big Bend, Baring Creek, Lake McDonald, Siyeh Bend, Jackson Glacier Overlook, and other sites. GNP is beginning a Park-wide comprehensive interpretive plan that will be completed in the fall of 2003. Park-wide interpretive themes and the Comprehensive Interpretive Plan will guide the identification and selection of wayside exhibits and other interpretive materials to tell certain elements of the Park's stories at appropriate locations. Orientation and informational signage will assist visitors with other needs at selected locations along the Road and throughout the Park.

New or updated roadside signs would be used to better communicate the location of Park attractions, distances, and direction. Real-time signage may be used during rehabilitation work to provide information on transit schedules, traffic delays, and parking.

Intelligent Transportation System. An ITS would be implemented to provide information on parking, safety, rehabilitation work, interpretation and orientation, traffic, operations and maintenance, and visitor services. An ITS is a computerized network linking information sources at locations throughout the Park with connections to the Internet. A fiber optic cable would be laid under the Road with real-time information provided at selected locations such as the orientation stations and kiosks previously described. The ITS would be designed to enhance communications before, during, and after rehabilitation. The fiber optic cable would also provide for improved telecommunication for Park staff.

The ITS would provide an important management tool for use during rehabilitation. Traffic volume information would be collected electronically and used to coordinate traffic control and provide efficient traffic flow on the Road. ITS information also would include location of work sites, current delays, road and weather conditions, transit schedules, and interpretive information on the rehabilitation. Transit stops would be equipped to provide real-time information to the visitor on the actual wait times for the next transit vehicle. The ITS also would produce visitor and vehicle data to allow Park staff to adjust operations to best meet the needs of the visitor while protecting Park resources.

Communication with Visitors during Rehabilitation. Timely and accurate information will be a key component to providing a quality visitor experience during Road rehabilitation. Both

the Park and the local tourism community would have a role in providing clear and concise information on the status of rehabilitation work. A variety of methods would be used to communicate information to Park visitors including:

- Interactive information on the Glacier website
- Links to the Glacier web page from other government web pages, prominent travel information web pages, and local governments, chamber of commerce, business, and tourism web sites
- Attachments sent in response to requests for information on the Park
- Public service announcements on local radio stations
- Enhanced ITS radio system in the Park
- Messages on local cable access channels
- Variable message signs along the Road
- Handout information provided at entry stations
- Messages and real-time data supplied by the ITS at visitor centers, orientation stations, and wayside interpretive exhibits
- Articulate and well-informed traffic flaggers

Mitigation for Alternative 3

Three categories of mitigation strategies would be implemented to minimize impacts on visitors and the local and regional economies in addition to the mitigation common to all alternatives described later in this chapter.

Mitigation Strategies for Impact on Visitor Access

Traffic management and increased transit service during rehabilitation have been incorporated into Alternative 3, as previously described. These measures are intended to maintain visitor access to

the Road and its attractions at levels as near to normal as possible during the rehabilitation project.

Mitigation Strategies for Impacts on the Visitor Experience

Improvements to visitor facilities and services were identified as potential mitigation strategies for impacts to the visitor experience in both the community leader workshops (WIS 2001b) and the business survey (WIS 2001d). The range of ideas presented was broad: more programs and hikes originating at the visitor centers, improved trails and campgrounds, improved customer service, major upgrades to existing facilities and construction of new facilities. A common suggestion was to turn the Road rehabilitation process itself into a positive part of the visitor experience.

Road rehabilitation in Alternative 3 would have a direct impact on the visitor experience because of disturbance to existing uses of the Road and of facilities along the road. As mitigation for these impacts, a variety of orientation, information, and interpretive measures would be implemented. These would be implemented during construction to improve the quality of the visitor experience. These measures include orientation and information stations, interpretive wayside exhibits and signage, an ITS, and a visitor communications program.

Mitigation Strategies for Impacts to Visitation Levels and Local Economic Activity

A reduction in visitation to GNP during rehabilitation is a great concern to business and community interests. Visitor expenditures are very important to the local economy in northwest Montana and southwest Alberta, Canada, and periods of reduced visitation in the past have affected local employment and income, imposed

economic hardship on tourist-oriented businesses, and hampered the economic development of the communities that depend on them.

Socioeconomic studies and surveys (WIS 2001b, WIS 2001d), which included workshops with local businesses, devoted considerable attention to identifying actions that would address the potential for reduced visitation during Road rehabilitation by:

- Enhancing other Park and local facilities to compensate for disruptions to the Road
- Promoting visitor development for the Park and other regional attractions
- Creating opportunities for visitors to stay longer

Recommended Visitor Development Strategies.

Public input to the CAC on the issue of economic development impact mitigation resulted in the recommendations issued in the final report of the CAC (NPS 2001a). The CAC focused first on a set of “visitor development strategies,” based on its review of the final report on the business survey (WIS 2001d), and then on a list of 15 “specific visitor development strategies,” based on the CAC’s review of the *Socioeconomic Study* (WIS 2001b). Table 4 presents a summary of these recommendations grouped by category.

Visitor Level and Local Economic Impact Mitigation Incorporated in the Alternatives.

Visitor development strategies such as those listed above are among the most difficult to pursue for a variety of reasons. Some call for actions by the NPS that may be constrained by existing management plans, authorizations, or budgets. Some are broad-based efforts that require leadership, planning, and concerted action among many institutions of various types within the community. Some may involve the coordination of policies at all levels of government—from local, to state, to national. Given these complexities, economic development impact

mitigation is often developed independently and the desired effects may be difficult to achieve.

Despite these difficulties, a number of the visitor development strategies proposed by the CAC have been incorporated into Alternative 3:

- Construction of a West Side Discovery Center near Apgar to improve visitor information and interpretive facilities. This facility would be located in the area of the proposed transit staging area and parking lot near the intersection of the Going-to-the-Sun Road and Camas Road. This facility was addressed in the GMP.
- Rehabilitation of the St. Mary Visitor Center on the East side of the Park to improve the quality of visitor services.
- Broadening the services provided at visitor centers to improve communications about construction status and potential alternative activities. These services would cost approximately \$47,000 to \$52,000 for two staff, new publications, exhibits about Road construction, and a video on Road rehabilitation.
- Developing information and adding staff to improve the experience of visitors stopped on the Road. This would cost about \$115,000 annually for seven staff and communications equipment. This does not include other indirect costs.
- To alert the public and the media to the potential for travel delays during Road rehabilitation, the Park would activate a public information program to aid visitors and local businesses. The estimated annual cost of this strategy is approximately \$35,000 to \$40,000 for a seasonal public information specialist.

Table 4. Visitor development strategies recommended by the CAC.

Strategy Type	Strategic Recommendation
Facilities Strategies	<ul style="list-style-type: none"> • Upgrade historic hotels in GNP • Upgrade existing and construct new amphitheaters in GNP • Construct West Side Discovery Center • Upgrade public transportation to and through GNP • Upgrade and construct amphitheater outside GNP • Improve roads adjacent to GNP
Visitor Development Strategies Recommended by the CAC	<ul style="list-style-type: none"> • Augment staff and information services for visitors during Road rehabilitation • Improve East Side Visitor Center exhibits • Broaden services at GNP visitor centers • Promote the development of tourism services on Highways 49, 89, 17, and 2
Marketing Strategies	<ul style="list-style-type: none"> • Use Lewis & Clark Bicentennial Commemoration to promote GNP attractions other than the Road • Improve Internet links to regional events, attractions, and resources • Refocus visitor prospect information on GNP attractions other than the Road • Develop travel industry partners to jointly market GNP • Hire national figure as marketing spokesperson • Upgrade media relations • Promote Blackfeet and Flathead heritage tours, events, and resources • Promote interest in GNP attractions other than the Road • Promote Waterton-Glacier International Peace Park heritage tourism
Organizational Strategies	<ul style="list-style-type: none"> • Improve “customer service” at GNP through hospitality training and Montana Super Host Program • Use NPS Ambassador Program effectively at GNP • Coordinate with local visitor development organizations • Support Blackfeet Nation efforts to designate Highway 49 a Scenic Byway • Schedule Road rehabilitation around the Lewis & Clark Bicentennial Commemoration • Jointly promote GNP Centennial and Lewis & Clark Bicentennial Commemoration

Potential Community-led Economic Impact Mitigation. The remaining visitor development strategies proposed as economic impact mitigation are those most difficult to pursue. They demand broad-based participation within the community and policy coordination at different levels of government. These strategy options, although not currently eliminated from consideration, have not been directly incorporated in the alternatives because they are beyond the authority of GNP and the NPS.

Most of these strategies have the potential to trigger visitor activity that would potentially offset any negative impacts of the Road rehabilitation “only if business and local economic and tourism development organizations have confidence in, adopt and adapt the actions to fit their circumstances. They are the ultimate implementers” (WIS 2001b). There have been several interim work sessions between local economic and tourism development specialists to review and prioritize the ideas (WIS 2001b). The outcome of this process has

yet to be determined. However, considerable potential remains, especially if the State of Montana, the Province of Alberta, Canada, and the local communities adopt some of the CAC's recommendations as part of a larger, coordinated economic development strategy. The Park intends to support a business planning process to assist community leaders in formulating marketing and visitor development strategies by requesting additional funding to participate in these efforts.

ALTERNATIVE 4—ACCELERATED COMPLETION WITH ISOLATED ROAD SEGMENT TRAFFIC SUSPENSIONS (ACCELERATED COMPLETION)

The objective of the Accelerated Completion alternative is to complete rehabilitation of the Going-to-the-Sun Road as quickly as possible by using isolated traffic suspensions during the week in construction zones and maintaining visitor access on the weekends. This alternative would implement Road repairs over 6 to 8 years, with a timesavings of about 1 to 2 years over Alternative 3. The rapid completion of rehabilitation would ensure that further Road deterioration and damage to historic, cultural, and environmental resources would be minimized. Alternative 4 includes all of the rehabilitation work necessary to repair the Road, improvements in visitor use facilities (the same as Alternative 3), and expanded transit service during rehabilitation (more extensive than Alternative 3). This alternative allows for advanced planning for completion of design and engineering and is the most efficient alternative from the construction standpoint because traffic suspensions allow for concentrated work efforts without maintaining traffic flow.

Scheduling and Funding

Rehabilitation of the Going-to-the-Sun Road under the Accelerated Completion alternative would take from 6 to 8 years. The total cost for implementing rehabilitation repairs, including transit service during rehabilitation, visitor use improvements, and mitigation measures, would range from \$126 million to \$144 million over the construction period (Table 2). This includes \$17 million for visitor use and socioeconomic mitigation measures for construction of the West Side Discovery Center, rehabilitation of St. Mary Visitor Center, and installation of an ITS. Implementation of expanded transit service would cost about \$8.2 million during the rehabilitation period. Projected operation and maintenance costs for the Road following rehabilitation would be about \$1.5 to \$1.9 million. This alternative provides the lowest cost and shortest rehabilitation schedule of the alternatives under consideration.

Traffic Management

Visitor access along the Going-to-the-Sun Road between West Glacier and St. Mary would remain open throughout the peak visitor season from spring to the third Monday in October subject to construction delays and suspensions. Traffic management under the Accelerated Completion alternative would allow for traffic on the entire Going-to-the-Sun Road, three days per week from Friday through Sunday (Table 2). During this period, traffic delays would be limited to a cumulative delay of 30 minutes over the length of the Road. From Monday through Thursday, visitor traffic would be suspended on Road segments undergoing rehabilitation. Road segments not under rehabilitation would remain open for motor vehicles, pedestrians, and bicycles. At a given time, about 40 miles (65 kilometers) or 80 percent of the Road would remain open to visitor access. Road

rehabilitation would be conducted at night, where feasible, to facilitate rapid completion of work.

Transit Service During Rehabilitation

Expanded transit service would be added during construction as a mitigation measure to facilitate visitor access along the Going-to-the-Sun Road and encourage alternative transportation similar to Alternative 3. For Alternative 4, the number of transit vehicles would be increased to 12 active vehicles and two backup vehicles. Transit vehicles would operate in both directions along the Road at 30-minute intervals during the peak and shoulder visitor season throughout the week. Transit bus stops would be located at major trailheads and key visitor attractions. Transit staging areas would be located near Apgar, Logan Pit, Sun Point, and St. Mary. The Apgar transit staging area would be located at the planned West Side Discovery Center and would accommodate parking for about 55 to 60 vehicles. About 4 acres (1.6 hectares) would be needed to construct this transit staging area. Transit parking at the St. Mary Visitor Center would be reconfigured to accommodate about 25 to 30 vehicles within the existing parking lot. Similar to Alternatives 2 and 3, the NPS will consider options to fund increased transit service and maintain reasonably priced fares.

Operations and Maintenance

Expanded operations and maintenance measures would be implemented for the Accelerated Completion alternative as described for Alternatives 2 and 3.

Visitor Use Improvements

Proposed visitor use improvements for the Accelerated Completion alternative are the same as those described for Alternative 3. Improvements to parking, pullouts, scenery and views, trails, toilets, and visitor orientation, information, and interpretation would be implemented.

Mitigation for Alternative 4

The increased intensity of rehabilitation work under Alternative 4 merits the activation of a public information program and implementation of other socioeconomic measures as described for



Concessioner buses at Golden Staircase

Photo by T.J. Hileman, GNPA #3082

Alternative 3. No additional mitigation actions are proposed for Alternative 4.

ACTIONS COMMON TO ALL ALTERNATIVES

Each of the alternatives would use similar construction techniques, mitigation measures and follow the same design standards for rehabilitation, including drainage, slope stability, roadway surface, retaining walls, guardwalls, and other features. On-going and currently planned rehabilitation work on critical retaining walls would continue for all alternatives.

This section includes a description of each of the principal Road segments and the types of rehabilitation-related work required, other common improvements, and mitigation measures incorporated into the project.

Proposed Rehabilitation Work by Road Segment

The entire Going-to-the-Sun Road needs to be rehabilitated. Completion of the extensive rehabilitation work would take several years no matter which alternative is selected. To guide rehabilitation work and prioritize efforts for the most critical locations and repairs, the *Engineering Study*

(WIS 2001a) prioritized Road segments and the types of rehabilitation work that should be completed first (Table 5). There are five principal segments of the Road, each with special characteristics and different rehabilitation requirements. Priorities for rehabilitation work listed in Table 5 are expressed by assignment of a 1 through 5 rating, with 1 being the highest priority.

The Alpine section of the Road is the highest priority for all categories of rehabilitation work. This is also the most difficult area in which to work because of the narrow roadway, steep slopes, and short work season. The *Engineering Study* identified 190 individual repairs for this 11-mile (18-kilometer) segment of the Road. The West Tunnel and Baring Creek segments of the Road also require extensive high and moderate priority repairs. The lower elevation segments of the Road along Lake McDonald and St. Mary Lake are the lowest priority and require the least amount of rehabilitation because they experience less distress from the natural elements and they have already undergone partial rehabilitation in recent years.

The following discussion provides an overview of each of the road segments and proposed improvements. Appendix A provides a list of proposed Road improvements by Road segment and milepost.

Table 5. Rehabilitation priority by Road segment and milepost (MP).

Rehabilitation Work	Lake McDonald MP 0.0-16.2	West Tunnel MP 16.2-23.4	Alpine MP 23.4-34.2	Baring Creek MP 34.2-43.2	St. Mary MP 43.2-49.7
Drainage	5	2	1	4	3
Slope stability	5	3	1	2	4
Retaining walls, arches, and tunnels	4	2	1	3	5
Guardwalls	4	2	1	3	5
Roadway pavement	4	2	1	3	5

Lake McDonald. The 16.2-mile (26-kilometer) Lake McDonald segment extends from the Park boundary at the bridge over the Middle Fork of the Flathead River near West Glacier to Avalanche Creek (Figure 2). The general condition of this section of the Road is fair to good. Asphalt paving was conducted on portions of this segment during the 1990s. Areas of slope instability between MP 6.4 and MP 9.1 require continued monitoring and possible future roadwork should slumping of the roadway accelerate. Minor repair work is needed on several retaining walls and guardwalls. Maintaining adequate fish passage would be addressed when replacing culverts at stream crossings.

West Tunnel. The 7.2-mile (12-kilometer) West Tunnel segment of the Road extends from Avalanche Creek to the West Tunnel (Figure 2). This section of the road is in fair to poor condition. Repairs to drainage structures are needed at many locations such as Logan Creek, Haystack Creek, and Alder Creek. Reconstruction of the outside edge of the roadway is needed in several locations because of slope instability. Retaining walls need repair and repointing, and a failed wall needs rehabilitation.

Alpine. The 11-mile (18-kilometer) Alpine segment from the West Tunnel to Siyeh Bend is the most critically in need of extensive rehabilitation (Figure 2). Road conditions throughout this section are generally poor. Proposed drainage work includes cleaning existing drainage structures, installing new cross drains and culverts, improving road surface drainage, installing erosion control measures at culvert outlets, and repairing other roadside ditch and drainage features. Stabilization of eroding cut slopes is needed in several locations, and selective rock scaling would be used to reduce safety hazards.

Within this segment of the Road, there are about 90 stone retaining walls in fair to poor condition. Several of the critically damaged walls are currently

under repair and rehabilitation of the remaining walls would be conducted according to prioritized need. Damaged guardwalls throughout this section would be reconstructed or rehabilitated as needed. Roadway foundation work to provide for adequate drainage and maintain the height of guardwalls would be required. The pavement would be resurfaced to stabilize the roadbase and seal the surface following completion of other repairs.

Baring Creek. The Baring Creek section is about 9 miles (15 kilometers) long and extends from Siyeh Bend to Rising Sun (Figure 2). This section of the Road is in fair to poor condition. Drainage work would include improvements to road surface drainage, cleaning and replacement of culverts, and correction of subsurface infiltration into the roadbase. There are fewer retaining walls and guardwalls in this section, but several would be repaired to correct stone displacement, sinking, and general deterioration. Roadway foundation repair and repaving or chip seal would be used to protect the surface from moisture intrusion.

St. Mary. The 6.7-mile (11-kilometer) St. Mary segment of the Road follows St. Mary Lake from Rising Sun to the Park boundary at St. Mary (Figure 2). This section of the Road was rehabilitated in the 1990s and is in fair to good condition. Miscellaneous culvert and structure repairs are needed to correct drainage deficiencies. Correction of wave action at the toe of the existing road slope is needed to prevent further erosion. Repairs to short segments of retaining walls and guardwalls are needed where walls are leaning or deteriorating.

Improvements are needed near the Road and the Divide Creek Bridge to correct drainage deficiencies and prevent flood damage (Figure 2). Several measures to prevent future flooding and resource damage were evaluated in the GMP. The preferred alternative includes relocation of Park employee

housing and administrative and maintenance facilities. These structures and associated activities would be moved out of the flood hazard zone of Divide Creek in St. Mary to another location. The *Engineering Study* (WIS 2001a) did not develop specific plans for Divide Creek. Previously, several options have been evaluated to protect the Going-to-the-Sun Road from flooding. The current plan is to stay with the existing alignment elevating portions of the Road and/or constructing low water crossings.

Road Rehabilitation Techniques

Rehabilitation of the Going-to-the-Sun Road involves a variety of repairs and improvements to structural features and the adjacent roadside. The majority of roadway repairs would occur within the previously disturbed roadway prism, which includes the pavement, shoulders, parking, and cut and fill slopes. Substantial areas of new disturbance are not anticipated because the existing Road alignment and width would remain unchanged. Temporary disturbance outside of the existing roadway prism may be necessary to provide construction access to the base of retaining walls or to facilitate necessary repairs, such as installation of culvert outlet protection. Following repairs, all disturbances within and outside of the roadway prism would be revegetated or reclaimed using native plants or structural material as appropriate.

For all alternatives, rehabilitation of historic structural features would be conducted to preserve the significant historic features that contribute to the Road's integrity and status as a National Historic Landmark. Key recommendations for preservation and rehabilitation of historic features identified in the *Cultural Landscape Report* (RTI 2002) include:

- The existing roadway alignment and width are an integral element of the Road's

historic significance and would be preserved.

- Remaining historic retaining walls and guardwalls would be preserved or rehabilitated in place.
- Rehabilitation of masonry walls would be done using material and techniques to replicate historic conditions.
- Historic bridges would be preserved.
- Existing historic culvert headwalls would be preserved and maintained if possible and new ones would be designed to use or simulate historic stonework.
- For all features, both historic design specifications and historic design philosophies (qualities such as texture, curvature, and rock sizing) would be adhered to.

Engineering design, rehabilitation techniques, and materials would be selected based on a long life cycle and operation and maintenance considerations. This ensures that Road repairs would be long lasting and would minimize operation and maintenance costs. The following discussion provides a description of the types of repairs and techniques that would be used to rehabilitate the Road.

Drainage Improvements

Inadequate roadway drainage is the greatest cause of the continued deterioration of the Road and its structures. A number of improvements to drainage structures would be used to protect the structural integrity of the Road, its associated historic features, and the adjacent natural resources. Measures would be implemented to prevent water intrusion into the Road subbase and to channel water away from structural features. Pavement would be sealed to prevent water from entering the roadbase. In areas where the roadway has sunk due to water intrusion, the existing roadbase would be rebuilt by removing

all unsuitable roadbase material and replacing it with suitable material in layers separated by geotextile fabric. Cross-drains, which are grate covered trench drains across the road surface, would be added where necessary to catch sheet flow and direct water across the roadway.

Improving roadway drainage would require the replacement or addition of new culverts. Where the culvert inlet or outlet is located in a historic wall, work would be conducted according to historic and cultural resource standards. New culverts may be used in some locations near existing undersized culverts to avoid impacts to historic features. Culvert replacement would most likely require traffic suspension because culverts cross both lanes. Installation of culvert linings would be considered as an option to replacement in select locations and this work could be done with minimal traffic disruption. Appropriate energy dissipating culvert outlets would be installed to dissipate flows and reduce erosion. Replacement culverts would be designed to accommodate fish passage.

Inadequate drainage inlets and outlets would be replaced during roadway rehabilitation. Where inlets are located on the traveled roadway, historically appropriate cover grates suitable for bicycle traffic would be used. Drainage outlets in historic stone masonry walls would be constructed to maintain the historic character. Log barriers or other suitable material would be used to protect vehicles from inadvertently entering drainage inlets.

Slope Stability Improvements

The steep precipitous rock cuts adjacent to portions of the Road create a potential safety hazard. Rock scaling would be selectively used to loosen and remove boulders and loose material before it dislodges and falls to the Road. Scaling would only be conducted within the existing Road prism and

would not extend beyond areas of previous disturbance unless a significant and obvious safety hazard is present. The historic visual characteristics of the Road would be considered when undertaking this work, and efforts would be made to minimize impacts to visual quality and plant communities. While rock scaling can reduce rockfall hazard, it cannot eliminate all risk along the Road.

A variety of environmentally sensitive techniques would be used to stabilize eroding cut slopes including revegetation and structural measures to hold the soil in place, capture moisture, and facilitate revegetation. A number of measures would be used to repair and stabilize steep fill slopes, including use of retaining walls, reinforced earth, and tiebacks or micropiles. In addition, outlet protection would be added where drainage outfalls are eroding the fill slopes.

Slope creep is generally confined to the outside lane of the Road and would be repaired by periodic repaving or, in more severe cases, structural measures. Techniques that would be used to protect the Road from slump failures include the construction of reinforced earth, tieback anchors, and subsurface drainage. Final design of these measures would follow further geotechnical investigations.

Measures to protect or minimize potential impacts from debris flows include installation of improved culverts, signage, and possible temporary road closure during high runoff events to protect visitors.

Avalanches are common throughout the steep high elevation portions of the Road. Techniques to reduce avalanche damage to Road structures include the selective use of avalanche resistant guardwalls, removable guardrails, and barrier rock as currently used at several locations.

Retaining Wall Improvements

FHWA has identified about 130 masonry retaining walls on the Road, many of which are in need of repair. Repairs would include correction of footings, drainage facilities, repointing of masonry, and other repairs. For many of the retaining walls, only the top 3 to 8 feet (1 to 2.4 meters) are damaged and would be rehabilitated. The design for each wall would depend on site-specific conditions, with consideration of geometric configuration, safety, and historic values. The preferred techniques being used to stabilize retaining walls would continue to be those that do minimal interference to visitor traffic and minimize disturbance to historic fabric. Principal repair techniques may include rebuilding the roadbase, constructing a concrete slab anchored with micropiles or tieback anchors, or stabilizing the backfill in place by high-pressure injection of high-strength grout directly through the face of the rock wall. Where retaining walls and their foundations have substantially deteriorated, additional techniques would be used.

There are currently several reinforced concrete retaining walls with partially finished stone veneer. The stone veneer varies in consistency and visual appearance from the original stone masonry work. Options for these walls include:

- Completing the remaining rock veneer work
- Removing the existing veneer, adding a footing extension to the retaining wall where practicable, and facing the concrete wall with a historically appropriate pattern

Guardwall Improvements

There are about 7 miles (11 kilometers) of stone masonry guardwalls along the Road. Many of the original guardwalls have experienced significant mortar deterioration, foundation failure (leaning or sinking), stone displacement and deterioration, and

water intrusion. Guardwalls have also experienced damage from annual snow clearing operations. Rehabilitation of the guardwalls would require the use of a variety of different techniques depending on the location and conditions for each specific site. Guardwall work would include:

- Repointing and patching of damaged or deteriorating guardwalls
- Lowering the existing roadway to expose the historical height of the guardwall and providing adequate drainage
- Raising guardwalls where lowering the Road is not possible
- Removing and reconstructing sections of guardwalls that have advanced foundation failure and/or loss of significant sections of stone
- Constructing reinforced concrete footings under new or replaced guardwalls
- Constructing avalanche resistant concrete core guardwalls

Tunnel Improvements

Tunnels are in generally good condition, but repair work on the West Tunnel is needed where the rock veneer is sloughing off and concrete is exposed. This would require stone masonry work to repair and replace damaged rock veneer. Additional stabilization or protection measures would be used on the side portals.

Roadway Improvements

The roadway itself requires rehabilitation in many locations to correct deficiencies in the roadbase, damaged pavement, and safety concerns. The roadway alignment and width are integral elements of the Road's historic significance and would be preserved. Minor deviations in roadway alignment and width would be used in a few select locations where the safety of visitors or Park staff may be

compromised. This includes several low elevation sites at pullouts, trailheads, pedestrian crossings, and areas with unstable ground. Minor curve widening and a shift in the centerline would occur at the Wild Goose Island Overlook to improve parking and visitor safety. To prevent the deterioration of the edges of the roadway from over-sized vehicles leaving the pavement, an additional 1 to 2 feet (0.3 to 0.7 meters) of pavement widening would be used on select curves in the Lake McDonald, Baring Creek, and St. Mary segments of the Road. Approximately 15 informal gravel pulloffs that have developed over time will either be removed and revegetated, or paved.

Several techniques would be used to provide long-term correction of damaged roadway segments depending on the severity of the damage. Areas where unsuitable roadbase material is present would require excavation and replacement with suitable material. In some locations, construction of a concrete slab across all or a portion of the roadway, which would be anchored with a combination of micropiles and tiebacks, is needed.

Different types of resurfacing would be used based on the specific conditions for each segment of the Road. It is anticipated that a hot asphalt mix would be used, but new asphalt technology is advancing and new mixes regularly emerge. An overlay would be used for lower elevation sections of the Road along Lake McDonald and St. Mary Lake. Because of the advanced deterioration of the Road at higher elevations and the need to retain the historic guardwall and rail heights, milling and resurfacing would be required. Resurfacing options that would be used depending on the locations and site-specific conditions include:

- Chip seal of the surface for areas not requiring repairs to the roadway foundation
- Overlay of the existing structure with additional layers of pavement; in locations

where past surfacing has raised the road surface and reduced the effectiveness of guardwalls, it would be necessary to remove the asphalt and/or road base prior to resurfacing

- In areas of deteriorated pavement and where repairs are needed to the roadway foundation, existing pavement and part of the base material would be removed and replaced with suitable base material; waste material would be hauled to a suitable stockpile location, and processed for reuse in roadway rehabilitation or recycled into the new asphalt pavement

Utilities Associated with the Road Corridor

Road rehabilitation would be coordinated with other utility work (water, sewer, telephone, power, ITS, fiber optics) located within the Road corridor to minimize disruption in traffic and disturbance to Park resources. The majority of the utility work would occur within the lower elevation portions of the Road.

Vegetation Management

A roadside vegetation management plan would be prepared to restore the Road's historic scenic vistas and improve safety and sight distance for motorists. Vista restoration would occur at locations identified in historical plans and photographs. Vegetation clearing would be implemented at locations scattered along the length of the Road, primarily at lower elevation sites including along Lake McDonald, McDonald Creek, The Loop, Jackson Glacier Overlook, Sun Point, and forested areas where dense roadside vegetation is present. Vegetation would be managed in accordance with previous documents, including the *GNP Roadside Maintenance Guidelines* (NPS 1993b), which covered the "maintenance of vistas and sight distance clearings within the road prism" for all Park roads. A

categorical exclusion was issued for this work on May 19, 1999. The *Vista Design Clearing Guidelines* (NPS undated) and the *Cultural Landscape Report* (RTI 2002) would also direct vegetation management. An overall Vista Management Plan would be prepared in the future to address the location and extent of vista clearing. In addition, woody vegetation that has become established within the masonry stonework of retaining walls and other structures would be removed to prevent weakening of the foundation, water intrusion, and damage to historic features.

Construction Staging During Rehabilitation

Staging areas are required during road rehabilitation to provide space for storage of materials, maintenance and dispatch of equipment, establishment of construction office facilities, and parking for construction workers. The proximity of staging areas to the work sites affects travel cost and the efficiency of the time and cost of the construction operations. Coordinating staging areas with construction sequences also minimizes damage to completed rehabilitation work. It is anticipated that the majority of staging operations would be located outside the Park for Alternatives 2, 3, and 4 because of the limitations in available space within the Park. The location for staging areas outside the Park would be determined during pre-construction negotiations with a construction contractor.

Within the Park, several small staging areas are available. Logan Pit, an existing maintenance storage area near Avalanche, would be used for material stockpiling, sorting, loading and delivery, precasting, fabrication, and equipment maintenance (Figure 2). This site is currently being used as a staging area for Road repair work and a maintenance yard. On the east side of the Park, Sun Point could

be used as a staging area. Sun Point is an existing large parking area and adjacent picnic area used for construction staging during original construction of the Road. A portion of the roadway and disturbance area within a rehabilitation work zone and existing pullouts also would be used for staging materials and equipment.

Material Sources

Original stone used for masonry work along the Road was obtained from within the Park but stone from outside of the Park has been used at times in recent years for repair work. Rehabilitation of masonry walls would require the collection of additional stone material, preferably from within the Park. Planned sources for acquiring suitable stone include naturally occurring rock fall material and material gleaned from rock scaling operations. Furthermore, the Park currently has about 2,800 tons of imported rock that was quarried and shaped for use on the Road. The use of rock sources outside of the Park would be considered if sufficient material is not available from within the Park. If needed, fill material would come from approved borrow sites located outside of the Park. Concrete batch plants may be located in the Park, but there would be no asphalt batch plants in the Park.

Water for dust abatement, compaction, and other contractor operations would be needed. Anticipated water sources include pumping from streams, lakes, and withdrawing from the Park water system.

Traffic Management and Visitor Access During Construction

Traffic management is one of the key distinctions between the rehabilitation alternatives as described previously in this chapter. However, several traffic management methods are applicable to all alternatives depending on the type of rehabilitation work. Traffic management would involve a combination of four primary traffic management methods:

- **Alternating One-Ways**—Work is restricted to one lane while the other lane is kept open for traffic. Traffic is allowed to flow in one direction while the other direction is stopped. When a specified time elapses, or when the traffic queue clears the site, traffic is allowed to flow in the opposite direction.
- **Intermittent Stops**—When only short periods are needed for work on both lanes of the Road, intermittent stops are most effective for controlling traffic and minimizing delays.
- **Two-Way Stops**—When work must be performed on both lanes of the Road, traffic is stopped in both directions for an hour or more while the work is executed. Traffic remains stopped in both directions until both lanes are available for traffic.
- **Traffic Suspension**—Certain operations that encompass the entire roadway width would require sustained traffic suspension on isolated segments of the Road.



Tour bus and visitors at The Loop, 1929

GNPA photo #3937

Table 6 provides an example of traffic control measures that would be needed for different types of rehabilitation work.

Visitor access to the Road during rehabilitation work would be similar for all alternatives, including No Action. Segments of the Road not under rehabilitation would be open to motorists, bicyclists,

Table 6. Types of rehabilitation work for each method of traffic management.

Alternating One-Ways	Intermittent Stops	Two-Way Stops	Traffic Suspension
<ul style="list-style-type: none"> • Valley pans, inlets, and outlets • Soil slope stabilization • Rock bolting • Retaining wall rehabilitation • Guardwall rehabilitation • Roadway foundation adjustments 	<ul style="list-style-type: none"> • Access to work site • Material delivery • Crane setup and removal • Soil slope stabilization • Asphalt removal • Resurfacing • Debris removal 	<ul style="list-style-type: none"> • Rock scaling • Roadway foundation adjustments • Soil slope stabilization • Rock bolting 	<ul style="list-style-type: none"> • Roadbase excavation • Major retaining wall rebuild • Bridge deck repairs • Work on narrow roadway sections • Culverts and cross drains

and pedestrians, subject to existing restrictions. At any given time, it is expected that at least 40 non-contiguous miles (65 kilometers) of the 50-mile (80-kilometer) Road would remain open to visitors. Logan Pass would remain accessible from at least one direction during rehabilitation, and the Road would be accessible during the Lewis & Clark Bicentennial Commemoration in 2005 and 2006. For all alternatives, emergency vehicles would be allowed entry throughout the Road during rehabilitation for medical emergencies, fire, or other critical needs.

For all alternatives, existing red bus and other tours would continue throughout Road rehabilitation. Tour stops to popular features would be maintained, although alternative stops may be necessary if a previously used stop is under construction.

Mitigation Measures

Mitigation includes those measures and actions taken to reduce the anticipated environmental effects of the proposed action. These measures may include actions to avoid, minimize, or mitigate potential impacts. Mitigation measures are an integral component of the proposed action and would be implemented as part of the project. A number of the mitigation measures are related to protection of natural and cultural resources during rehabilitation work are common to all alternatives and included in construction costs. Other measures, including visitor use improvements, transit service, and economic mitigation measures, vary by alternative as previously described for each alternative. Described below are those mitigation measures identified for construction-related activities, natural resources, cultural resources, and socioeconomic resources that are common to all alternatives.

Construction Stipulations and Mitigation

A number of mitigation measures for construction-related activities would be incorporated into the project design to reduce natural and cultural resource impacts. Construction specifications would include the detailed requirements that the construction contractor would use for implementing these mitigation measures. An overview of construction-related mitigation measures is provided below. Additional measures specific to each resource are included in subsequent sections.

Construction Design Mitigation Measures

- The existing Road alignment would be maintained except for minor modifications at Wild Goose Island Overlook for safety and curve widening for large vehicles on the lower Road sections.
- Design specifications for rehabilitation of the roadway, retaining walls, guardwalls and other features would avoid sensitive resources and minimize the amount of disturbance necessary during construction.
- Rehabilitation design for historic features would follow the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (USDI 1998) and consider recommendations from the *Cultural Landscape Report* (RTI 2002).
- Design parameters to correct drainage deficiencies, stabilize slopes, repair damaged masonry, and other improvements would include measures to provide both short- and long-term protection of adjacent natural resources.
- During final design, engineers and resource specialists would conduct field reviews to ensure that improvements meet design objectives and protect natural and historic resources.

Construction Operation Mitigation Measures

- Construction zones would be identified and fenced with appropriate materials to confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications, and workers would be instructed to avoid conducting activities beyond the construction zones.
- A safety plan would be developed prior to initiation of construction work to ensure the safety of Park visitors, workers, and Park personnel.
- Construction staging areas would be identified and limited to existing areas of disturbance or within the specified work zone for each project.
- No material borrow sources (other than native rock collection) or asphalt batch plants would be located in the Park.
- Wherever practicable and within the overall objectives of the rehabilitation, the *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects* (FHWA 1996 and updates) would be implemented.
- Equipment servicing or refueling within 100 feet (30 meters) of streams would be avoided. Where not avoidable, appropriate containment policies would be implemented.
- All chemicals and petroleum products would be stored and contained away from water sources.
- All hazardous material use would require contractor compliance with applicable federal and state laws.
- No chemicals would be used for dust abatement.
- Vehicle traffic would be managed within the construction zone, and contractor hauling of materials, supplies, and equipment would be controlled to minimize disruptions in visitor traffic.
- Traffic delays, night closures, and other limitations in visitor access would be disclosed in advance of construction.
- Contractors would coordinate with Park staff to reduce disruption in normal Park activities. Construction workers would be informed about the special sensitivity of Park values, regulations, and appropriate housekeeping.
- Resource specialists including landscape architects, biologists, botanists, historians, environmental specialists, and archeologists would be involved in inspections and monitoring, and would provide recommendations during rehabilitation work.
- Construction crews would use buses or vans to commute to work sites in the Park to reduce traffic where appropriate on a project-specific basis.
- Excess excavated material would be removed from the Park. However, stone for masonry work would be retained.

Natural Resource Mitigation

Geology, Soils, and Water Resources

Geologic features such as rock outcrops and the steep rock walls that line the Going-to-the-Sun Road would be protected by minimizing disturbance to roadside geology. Rock scaling operations would be limited to those locations where rockfall hazards have been identified within the existing roadway prism, and only the amount of rock necessary to increase safety would be removed. Excavation would be selectively used to complete necessary rehabilitation and care would be taken to avoid damaging rock that would remain.

Erosion control measures from the *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects* (FHWA 1996 and updates) would be used for rehabilitation work.

In addition, a stormwater and sediment control plan would be prepared prior to construction to protect soil resources, minimize erosion, and prevent sediment-laden water from entering nearby streams. Components of this plan include implementation of measures to minimize the loss of soil material before, during, and after construction. General erosion control best management practices (BMPs) typically would include:

- Minimizing the area of disturbance to defined construction limits and limiting the time soil is exposed.
- Conducting site-specific geotechnical and drainage monitoring.
- Installing filter barriers (silt fences, certified weed seed free straw bales, coir logs).
- Constructing sediment retention structures (temporary and permanent sediment traps, sediment basins).
- Providing culvert outlet protection (riprap aprons or basins to reduce water velocity and prevent scour) and provisions for fish passage.
- Armoring ditches on a site-by-site basis to prevent scouring and erosion.
- Revegetating disturbed areas.
- Conducting periodic water quality monitoring in nearby streams.

Topsoil would be removed prior to any ground disturbing activities and stored for use in revegetation rather than importing topsoil from outside the Park. Selective topsoil redistribution to soil deficient areas would be used as needed, but topsoil would not be stockpiled over the winter. Long-term soil protection would come from prompt revegetation of disturbed areas following construction as described below.

Vegetation

Impacts to native vegetation adjacent to proposed rehabilitation work sites would be minimized by limiting the area of disturbance and using temporary barriers to define the work zone. NPS staff restoration biologists and landscape architects would work closely with construction contractors to minimize impacts to vegetation and ensure acceptable reclamation and revegetation of disturbed areas.

Mitigation to reduce impacts on vegetation resources and ensure revegetation of disturbed areas would include several measures:

- Implementation of BMPs to prevent wind and water erosion.
- Salvage of topsoil with existing seed sources, along with suitable plant material for transplanting.
- Implementation of landscaping design features, such as slope rounding, to minimize visual impacts and to aid in creating suitable site conditions for revegetation.
- Application of topsoil and native seed according to site-specific conditions and vegetation communities.
- Application of soil amendments, mulches, organic matter, and other measures as appropriate to facilitate revegetation.
- Revegetation to restore native vegetation to areas disturbed during rehabilitation
- Revegetation seeding and planting using native species from genetic stocks originating in the Park. Plant species density, abundance, and diversity would be restored as nearly as possible to pre-construction conditions for non-woody species.
- Monitoring to evaluate vegetation cover and development of contingency and maintenance plans if vegetation cover is not similar to original ground cover.

- Preparation of a vegetation management plan for the entire Going-to-the-Sun Road.

both sides of the road with culverts, subsurface drains, or other measures.

Additional measures to prevent the introduction and spread of noxious weeds during construction include:

- Continuing current weed management practices in accordance with the Park's *Exotic Vegetation Management Plan* (NPS 1991) and including preventative measures in all rehabilitation contracts.
- Conducting weed control measures prior to ground disturbing activities.
- Minimizing the area of disturbance and the length of time that disturbed soils are exposed.
- Avoiding use of topsoil currently supporting exotic plants.
- Inspecting construction vehicles to prevent the import of weeds from tires and mud on the vehicles.
- Limiting the use of fertilizers that may favor weeds over native species.
- Using periodic inspections and spot controls to prevent weed establishment. If weeds invade an area, an integrated weed management process to selectively combine management techniques to control the particular weed species would be used.

Wetlands

Mitigation measures to avoid and minimize direct and indirect impacts to wetlands would include:

- Placement of silt fences or other barriers adjacent to wetlands and streams to avoid direct impacts from construction equipment.
- Use of best management erosion and sediment control measures to prevent the introduction of sediments into wetlands and waters of the U.S.
- Maintenance of the existing hydrologic connections between wetlands located on

Wildlife and Aquatic Resources

Mitigation and conservation measures would be incorporated into the selected alternative to minimize potential impacts on wildlife. Mitigation measures applicable to minimizing wildlife and aquatic habitat impacts and wildlife/vehicle collisions for all species are described below.

- Removal of snags and cavity nest trees would be avoided to the extent possible. If clearing is necessary, cavity trees would be removed during the non-breeding season.
- Surveys for sensitive and listed bird species nests would be conducted prior to ground disturbing activities.
- Surveys of culverts and bridges would be conducted for evidence of bird (mostly swallow nesting), bat (mostly roosting/food digestion sites), and other wildlife use prior to construction activity to minimize disturbance during the nesting season.
- Where existing social trails are formalized, actions would be taken to prevent creation of new social trails.
- Timing and location of construction activities would be used to minimize disruption of wildlife foraging and movement patterns.
- Loud construction noises within about 2,600 feet (800 meters) of active golden eagle nests, depending on terrain and vegetation, would be avoided between April 1 and August 1.
- If culvert replacement is needed, oversized culverts would be used selectively to provide crossings for small to medium sized mammals as well as amphibians and reptiles, and to address fish passage concerns where appropriate.

- Highly palatable plant species would not be planted adjacent to the road to minimize attracting wildlife.
- A stormwater management plan would be prepared with BMPs used to minimize erosion and the introduction of sediments to aquatic habitat during and after construction.
- Drainage improvements would be used to control runoff and reduce erosion.
- Sediment traps would be used selectively to capture road sand and erosion from runoff prior to discharge into streams.
- Animal-proof garbage collection and food storage requirements would be incorporated into all work contracts and plans. Human waste management mitigation also would be incorporated into all contract and work plans.

Threatened and Endangered Species and Species of Concern

Mitigation measures for threatened, endangered, and species of concern would be similar to those used to protect other wildlife, aquatic life, and wetlands. Other measures that would be incorporated into the final design include:

- Use best management erosion and sediment control measures to prevent sedimentation of aquatic habitats used by bull trout.
- Implement measures to reduce potential for bear-human conflicts. Require construction personnel to adhere to park regulations concerning food storage and refuse management.
- Provide adequate cleaning of areas and garbage collection to limit wildlife access to human food and garbage.
- Enforce regulations that prohibit feeding of wildlife and that require proper food storage.
- Provide adequate portable restroom facilities for construction workers to eliminate human urine as a wildlife attractant at construction sites.

- Inspect equipment for hydraulic fluid, antifreeze, and oil leaks prior to use at construction sites, and keep materials on site for clean up of any motor vehicle or heavy equipment fluid spills that may occur (such fluid spills are potent unnatural attractants for wildlife species including mountain goats and mule deer).
- Limit night construction and timing of construction near bald eagle nests.

Air Quality

Mitigation measures to prevent degradation of air quality include:

- Dust abatement measures, such as watering unpaved disturbed areas, would be implemented.
- Disturbed areas would be revegetated as soon as possible after construction to reduce airborne particulates.
- If needed, asphalt batch plants would be located outside of the Park and would be sited in compliance with Montana Department of Environmental Quality (DEQ) requirements.

Visual Resources

Mitigation measures to prevent impacts to visual resources include:

- Rehabilitation of the deteriorating roadway and stone masonry work would be used to restore the scenic quality of the Road.
- Native stone would be used whenever and wherever possible for retaining walls, guardwalls, and other stone features to blend the structural components of the Road into the natural setting.
- Revegetation would mitigate areas of construction-related disturbance.
- Selective roadside vegetation management would be used to recapture historic scenic views.

- Any additional structures and modifications would reflect the historic and natural setting of the Road.
- Materials and their design would reflect a cultural design philosophy and rustic character of GNP.
- GNP's *Roadside Maintenance Guidelines* (NPS 1993b) and recommendations from the *Cultural Landscape Report* (RTI 2002) would provide guidance for mitigating impacts to visual resources.

Natural Soundscape and Lightscape

Mitigation measures to prevent impacts to the natural soundscape and lightscape include:

- All construction equipment would contain adequate mufflers and pollution emission controls.
- Night construction would be avoided near Apgar, Lake McDonald Lodge, Sprague Creek Campground, Rising Sun, and St. Mary and other sensitive areas that may affect visitors and wildlife.
- Information on construction zones would be available to visitors so that they can plan their recreation activities accordingly to avoid areas of noise and disturbance.

Cultural Resource Mitigation

Preliminary planning and final design for rehabilitation of historic features on the Going-to-the-Sun Road have and would incorporate design criteria, guidelines, and regulatory standards to avoid and minimize potential adverse impacts. Rehabilitation work would be conducted in accordance with Secretary of the Interior's *Standards for the Treatment of Historic Properties* (USDI 1998) and recommendations from the *Cultural Landscape Inventory* (RTI 2001) and *Cultural Landscape Report* (RTI 2002). The NPS would consult with the State Historic Preservation

Office (SHPO) and Advisory Council on Historic Preservation (ACHP) throughout rehabilitation. If an adverse effect cannot be avoided, it would be necessary to consult with the SHPO and to mitigate the adverse effect. The type and level of mitigation required would vary depending on the resource involved and the level of damage. Historic documentation, public interpretation, and restoration of related historic resources are among potential mitigation steps.

Socioeconomic Resource Mitigation

As noted in the Going-to-the-Sun Road *Socioeconomic Study* (WIS 2001b), the Road rehabilitation project would affect people and businesses, as well as the environment. This is especially true for the economies of three Montana counties and the part of southwest Alberta adjacent to the Park. These areas depend on tourism to a substantial degree, particularly in communities closest to the Park boundaries. Therefore, considerable effort was devoted to the development of strategies that would mitigate the socioeconomic impacts of the proposed Road rehabilitation.

During the Going-to-the-Sun Road *Socioeconomic Study* and the companion Going-to-the-Sun Road *2001 Business Development Survey* (WIS 2001d), potential socioeconomic mitigation strategies or visitor development strategies, were solicited during working sessions with local economic development and tourism development specialists. This information was used by the CAC in its advice forwarded to the NPS on alternative strategies to use during Road rehabilitation (NPS 2001a).

The strategies break down into three categories, based on how they address the key concerns of maintaining: 1) visitor access; 2) the quality of visitor experience; and 3) visitation during the Road

rehabilitation project. All of the mitigation categories have the potential to help reduce or offset potential socioeconomic impacts on the local economies during Road rehabilitation and to potentially minimize the impacts on visitation. However, limitations in funding and the authority of the Park make it necessary to select a strategy from among many options for use in the Road rehabilitation project.

The majority of socioeconomic mitigation strategies would be implemented under Alternatives 3 and 4, because of the greater intensity of work and the shorter construction schedule. However, several socioeconomic mitigation strategies are common to all alternatives. Traffic management measures would be used by all alternatives to reduce the impacts on visitor flow during construction. As described in previous sections, each alternative would provide different techniques to maintain traffic and visitor flow during rehabilitation. In addition, each alternative would maintain varying levels of transit service during rehabilitation to provide an alternative transportation method for visitors. The Park would emphasize public information and communication strategies to inform visitors on the condition of the Road, delays, and other information that would impact visitor travel.

Several visitor developments not specifically included in the rehabilitation of the Going-to-the-Sun Road would have benefits recognized by all alternatives. Planned upgrading of the historic hotels in GNP would contribute to the quality of visitor services. Although in the early stages of development, hotel code compliance and upgrading is expected to cost about \$100 million.

ALTERNATIVES AND MITIGATION EXCLUDED FROM FURTHER CONSIDERATION

Several additional alternatives were considered and eliminated during preparation of the Park's GMP. These alternatives were not reconsidered in this EIS. The *Engineering Study* (WIS 2001a) also evaluated options for Road rehabilitation and traffic management. One alternative method of traffic management was considered but eliminated. In addition, other visitation and economic impact measures were considered, but eliminated from consideration.

Convert the Going-to-the-Sun Road to a One-Way Loop During Rehabilitation

One option considered to maintain traffic flow during construction was to allow traffic from one direction to continue unimpeded. This could include alternate directional traffic either east or west along the Going-to-the-Sun Road. There are several disadvantages with this alternative. One disadvantage is visitors not intending to travel the entire length of the Road would be required to loop back to their starting point using State Highways 2, 49 and 89 (Figure 1). The total loop distance using these highways and the Going-to-the-Sun Road is about 135 miles (215 kilometers). This would be a considerable inconvenience for visitors planning a short day trip to Logan Pass, trailheads, or other destinations along the Road. Also, the need to continually move material, equipment, and construction personnel both directions on the Road would require a significant level of traffic management to frequently stop visitors for construction-related traffic. The one-way loop also would have effectively eliminated all over-sized

vehicles from using the Road because once they got to the turnaround point (Avalanche or Sun Point), they could not turn and drive in the opposite direction. For these reasons this alternative was eliminated from further consideration.

Visitation and Local Economic Impact Mitigation Eliminated from Consideration

Some of the proposed economic development impact mitigation calls for actions by the NPS that are constrained by existing management plans. The NPS reviewed the visitor development strategies during the *Socioeconomic Study* (WIS 2001b) and eliminated from further consideration:

- Winterizing historic hotels
- Constructing new outdoor amphitheaters

Although these strategies may be desirable from some perspectives, they conflict with adopted policies for management of the Park, as reflected in the GMP.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act (NEPA) of 1969, which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that the environmentally preferable alternative is the alternative “that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural and natural resources.” As expressed in NEPA’s Section 101, “it is the continuing responsibility of the Federal Government to:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life’s amenities; and
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.”

The environmentally preferred alternative for rehabilitation of the Going-to-the-Sun Road is based on these national environmental policy goals. A discussion of how each alternative meets these goals follows.

Alternative 1— No Action (Repair as Needed)

This alternative does not fully meet provisions for protection of environmental and cultural resources and, most importantly, a National Historic Landmark and premier visitor experience. While Alternative 1 would eventually repair deteriorating road conditions and rehabilitate cultural features, degradation of these resources is likely to continue if corrective actions are extended over 50 years. Alternative 1 does not correct existing pullout deficiencies that create visitor safety concerns. This

alternative does not fully meet the provisions of the environmental policy goals.

Alternative 2—Priority Rehabilitation

Alternative 2 would provide for protection of environmental and cultural resources by implementing Road repairs over a 20-year period. While this is an improvement over Alternative 1, it does not provide the same level of resource protection as Alternatives 3 and 4 and does not fully meet provisions 1 and 4 of the environmental policy goals. Deterioration of historic cultural resources and damage to natural resources would continue until repairs are completed. This alternative does not include the visitor use improvements included in Alternatives 3 and 4 that improve safety and hence does not fully realize provisions 2 and 3 of the national environmental policy goals.

Alternative 3—Shared Use

This alternative seeks to meet the environmental policy goals by providing needed corrections to the structural integrity of the Road, rehabilitating and preserving historic cultural features, improving visitor safety, and protecting natural and scenic resources. Proposed improvements would be implemented over 7 to 8 years, which would minimize further significant deterioration of environmental and cultural resources. This alternative meets national environmental policy goals 2 and 4 by preserving the Road's status as a National Historic Landmark. Alternative 3 addresses the need to balance needed rehabilitation repairs, while maintaining visitor access and minimizing impacts to regional businesses that depend on tourism. Alternative 3 would realize each of the provisions of the national environmental policy goals.

Alternative 4—Accelerated Completion

Alternative 4 is similar to Alternative 3 and would likewise realize each of the provisions of the national environmental policy goals. This alternative best meets provisions for protecting environmental and cultural resources because needed Road rehabilitation would be implemented in the shortest period of time (6 to 8 years). The Road's status as a National Historic Landmark would be preserved under this alternative. However, Alternative 4 does not provide the best balance for resource protection, maintaining visitor use, and minimizing impacts to regional businesses. Accelerated completion of the Road would require restrictions in visitor access and does not fully meet provisions 3 and 5 of the national environmental policy goals to the same extent as Alternative 3.

The Environmentally Preferred Alternative

The environmentally preferred alternative is Alternative 3 because it surpasses other alternatives in realizing the full range of environmental policy goals stated in Section 101 of NEPA. Alternatives 1 and 2 do not provide for the near-term protection of natural and cultural resources and lack measures to reduce all of the safety concerns. Alternative 4 meets the provisions of the environmental policy goals, but restricts visitor access and would result in adverse economic consequences to local communities. Alternative 3 is the environmentally preferred alternative because it: 1) provides a high level of protection of natural and scenic resources; 2) preserves the Road's status as a National Historic Landmark; 3) maintains visitor access throughout rehabilitation; and 4) best balances resource protection, preservation of historic features, while minimizing economic impacts to the local economy.

SUMMARY

Table 7 provides a summary comparing the potential environmental effects of alternatives. Additional discussion of resource impacts for each of the alternatives is included in Chapter 4.

Table 7. Comparison of alternatives and impacts.

Impact Topic	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
VISITOR USE AND EXPERIENCE	The visitor experience at GNP would continue to be affected by the deterioration of the Road. Although visitors would encounter few traffic delays from Road repair, the potential for Road failure would remain relatively high. Baseline annual visitation would grow slowly over the next 20 years from about 1.7 to 1.9 million. Transit operations would continue at current levels, and no new visitor service operations would be planned.	Similar to Alternative 1 only there would be more construction sites and traffic delays. Despite delays, visitors would maintain full access to all sites along the Road throughout the construction period. Minor adverse impacts to the visitor experience are anticipated during construction, but a reduction in annual visitation of about 87,000 is projected. Two new transit vehicles would be added to provide destination transit service for tour groups. Visitor service improvements would be limited.	Improved Road conditions would improve both the visitor experience and visitor safety. Upgraded parking and pullouts would also improve traffic flow and safety. In the short term; however, visitors would experience minor adverse impacts to the visitor experience from traffic delays. During the shoulder seasons, visitor access to the Road would be limited to areas not under construction, but 80% of the Road including Logan Pass would remain accessible. A 132,000 fewer visitors are projected to visit the Park during rehabilitation. Mitigation measures to reduce potential impacts to the visitor experience include expanded transit service, pullout rehabilitation, additional toilets, trail improvements, information facilities, interpretive exhibits, and other facility improvements.	Similar to Alternative 3, except that visitor access would be limited to the portions of the Road not under construction throughout both the peak and shoulder seasons Monday through Thursday. This would have a moderately adverse impact on the visitor experience and is estimated to reduce annual visitation by 280,000. Visitor use improvements similar to Alternative 3, plus additional transit service, would help minimize impacts.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES
GOING-TO-THE-SUN ROAD REHABILITATION PLAN/DRAFT ENVIRONMENTAL IMPACT STATEMENT

Impact Topic	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
LOCAL AND REGIONAL ECONOMY	Continued and increasingly expensive Road maintenance and repairs would be required. Over the lengthy rehabilitation period, these additional maintenance requirements would divert an ever-increasing share of already scarce Park resources away from other Park operations. Road rehabilitation would have negligible effects to the local economy, but should Road failure occur during this period, it could cause visitation to plummet and produce significant adverse economic consequences for the region. The baseline economic output from this alternative is about \$176 million annually.	Similar to Alternative 1 except that the rehabilitation period is significantly shorter, reducing the potential for catastrophic Road failure. A reduction in tourism-related expenditures during rehabilitation is estimated at about \$7.7 million annually. This would be partially offset by about \$2.7 million in construction related spending. The net annual economic impact would be about \$5 million. Negligible environmental justice impacts are estimated.	Projected reductions in visitation during rehabilitation would be estimated to reduce tourist-related economic output by about \$11.5 million annually. The short-term annual reduction in visitor spending would be somewhat offset by the short-term increase in employment of seasonal construction workers and construction related spending of \$7.3 million. The net annual economic impact would be about \$4.3 million. Negligible environmental justice impacts are estimated.	The short-term reduction in annual visitor spending is projected to be substantially higher than Alternative 3 due to limitations in Road access throughout the visitor season. A projected reduction in tourism-related expenditures of almost \$27 million annually would occur from reduced visitation to the Park. Construction related expenditures would reduce this impact by about \$7 million, for a net economic impact of \$20 million. Construction will take 1 to 2 fewer years than Alternative 3; therefore, impact would occur for a shorter time. Moderate adverse environmental justice impacts are estimated, particularly in Glacier County.
CULTURAL RESOURCES	Negligible effect on archeological and ethnographic resources. Short-term minor to moderate effects to historic features and cultural landscape from construction disturbance. Major adverse long-term effect on historic resources and cultural landscape if rehabilitation is implemented over 50 years and resources continue to deteriorate.	Adverse impacts would be slightly reduced compared to Alternative, 1, but moderate to major adverse, long-term effect to historic resources and cultural landscape are likely if repairs take 20 years to implement.	Negligible effect on archeological and ethnographic resources. While continued impacts to historic features and cultural landscape are possible, implementation of repairs to historic features in 7 to 8 years would have a long-term major beneficial effect upon completion of rehabilitation.	Same as Alternative 3, except repair of historic features 1 or 2 years sooner would reduce the potential for further deterioration.

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Impact Topic	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
TOPOGRAPHY, GEOLOGY, AND SOILS	Minor short-term effects from ground disturbance during rehabilitation. Delays in repairs would lead to a moderate long-term loss of soil and reduced productivity and increased potential for Road failure and adverse effects to geologic resources.	Similar to Alternative 1, but repairs would be implemented over a shorter period. Moderate long-term losses in soil and potential for instabilities that could lead to damage to geologic resources.	Minor short-term losses in geologic and soil resources from Road rehabilitation plus additional moderate long-term losses in soil resources from construction of new pullouts, trails, and parking areas. Moderate beneficial effect from correcting existing drainage and erosion problems.	Similar to Alternative 3, but work would be implemented sooner and existing areas of erosion and instability would be addressed quicker.
WATER RESOURCES AND WATER QUALITY	Minor short-term effect to hydrology and water quality at localized construction sites from sedimentation of streams and lakes. Implementation of repairs over 50 years would delay needed repairs to the drainage system, which could contribute to moderate long-term impacts to water quality.	Similar to Alternative 1. A delay in drainage improvements would allow continued impacts to water quality over the 20-year rehabilitation period. Moderate long-term effects until repairs are completed.	Minor short-term adverse effects to hydrology and water quality during rehabilitation and improvements to visitor facilities from construction disturbance. Minor to moderate beneficial improvements from completing drainage improvements, stabilizing eroding roadside slopes, and formalizing or reclaiming social trails near water features. An increase in impermeable surface with visitor use improvements would have a minor long-term effect on runoff.	Similar to Alternative 3, but beneficial drainage work, slope stabilization, and trail improvements would be implemented 1 to 2 years sooner.

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FLOODPLAIN	Negligible short-term effect on localized flooding because other than Divide Creek, there would be no substantial changes to the roadway. Elevation of the Road or use of low water crossings in the Divide Creek floodplain would have a moderate to major beneficial effect by allowing a more natural dispersion of flood flows and protection of the Road and historic bridge.	Same as Alternative 1.	Same as Alternative 1, with negligible additional floodplain impacts from improvements to visitor use facilities.	Same as Alternative 3.
VEGETATION	Minor loss and short-term disturbance to vegetation adjacent to the Road. The majority of the disturbance would occur within the existing Road prism. Vista clearing to restore scenic views would result in a minor long-term loss of roadside vegetation. Revegetation of disturbed sites with native plants would reduce long-term effects. Minor short-term introduction of exotic plants is possible, but weed management would attempt to prevent spread. Delays in revegetating existing eroding slopes may result in moderate to major long-term impacts to vegetation.	Similar to Alternative 1, although revegetation of existing slopes would be implemented over 20 years instead of 50 years. Minor short-term introduction of exotic plants is possible, but weed management would attempt to prevent spread.	Minor short-term temporary impacts to vegetation similar to Alternative 1 during rehabilitation. A minor long-term loss in vegetation resources (5.5 acres; 2.3 hectares) for construction of new pullouts, parking, and trails. A minor long-term beneficial impact would occur from revegetation of existing disturbances and rehabilitation of social trails. Minor short-term introduction of exotic plants is possible, but weed management would attempt to prevent spread.	Same as Alternative 3, except a total of 7.5 acres (3 hectares) of vegetation would be lost from construction of a larger transit staging area at Apgar.

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Impact Topic	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
WETLANDS	Negligible to minor short-term effect. Wetlands would be avoided and temporary disturbances promptly restored without loss of function or value.	Same as Alternative 1.	Same as Alternative 1. Wetlands would be avoided when implementing visitor use improvements.	Same as Alternative 3.
WILDLIFE	Minor to moderate short-term disturbance to wildlife from construction noise and human activity. Minor long-term loss in habitat because most work would be conducted within the existing Road prism. Although work sites would be small, wildlife displacement near the Road would extend over 50 years.	Similar to Alternative 1, but construction activities would extend over 20 years.	Similar to Alternative 1, but wildlife displacement near the Road would occur over 7 to 8 years. A minor long-term loss of wildlife habitat (5.5 acres; 2.3 hectares) from construction of new pullouts, parking areas, and trails. There would be a moderate long-term impact to wildlife from implementation of the Baring Creek Cabin Trailhead and Logan Pit developments. The impact of habitat loss would be minimized by locating new facilities adjacent to or near existing developments.	Similar to Alternative 3, but an additional minor loss of wildlife habitat (2 acres; 0.8 hectares) would occur from construction of a larger transit parking area near Apgar.
AQUATIC RESOURCES	Minor short-term disturbances where roadwork is adjacent to streams and lakes from sedimentation. No direct effect to aquatic habitat. Existing drainage deficiencies that lead to water quality concerns would not be implemented soon enough to prevent further water quality and potential aquatic life impacts.	Similar to Alternative 1, but beneficial effects to water quality and aquatic habitat from drainage improvements would be implemented sooner.	Similar to Alternative 1 during rehabilitation, but drainage deficiencies and benefits to aquatic life would be implemented in 7 to 8 years. Additional visitor use facilities would result in minor short-term impacts to aquatic life near construction sites.	Similar to Alternative 3, with beneficial effects implemented 1 to 2 years sooner.

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Impact Topic	Alternative 1 Repair as Needed (No Action)	Alternative 2 Priority Rehabilitation	Alternative 3 Shared Use (Preferred)	Alternative 4 Accelerated Completion
THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN	Negligible to minor short-term effects on habitat. Minor to moderate short-term effect on bald eagle foraging, and grizzly bear, gray wolf, and lynx movement and activity during construction. Minor short-term effect on bull trout from sedimentation. Moderate short-term disturbance and possible displacement of golden eagle, harlequin duck, bighorn sheep, mountain goat, and wolverine during rehabilitation. No effect to threatened or endangered plants and no known effect to plants of concern. Future plant surveys of all impacted sites would be conducted prior to construction.	Same as Alternative 1.	Similar to Alternative 1. Minor to moderate short-term additional disturbances during implementation of visitor use improvements. The Shared Use and Accelerated Completion alternatives would have a moderate, short-term adverse effect on grizzly bears during construction, and a moderate, long-term adverse effect from new parking areas at Baring Creek Cabin and Logan Pit. Minor long-term loss of habitat for other species. Potential long-term adverse affect to state rare velvet-leaf blueberry plant near Apgar transit staging area.	Similar to Alternative 3, plus an additional disturbance of velvet-leaf blueberry habitat near Apgar for transit parking.
AIR QUALITY	Negligible to minor temporary increase in emissions and a decrease in visibility from dust and construction vehicle emissions.	Similar to Alternative 1, although additional construction sites would have slightly greater emissions. The addition of two transit vehicles would have negligible to minor beneficial effect on air quality by reducing traffic.	Similar to Alternatives 1 and 2, but additional construction sites and visitor use improvements would increase the potential for vehicle emissions and dust. Impacts would be minor and short-term. Increasing transit system capacity to seven vehicles would have a minor long-term beneficial effect by reducing traffic.	Similar to Alternative 3, plus expansion of the transit system to 14 vehicles would have minor long-term beneficial effect.

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VISUAL RESOURCES	Negligible to minor short-term effects to visual quality from introduction of equipment and construction disturbance. Delay of repairs to a 50-year period could result in moderate to major loss in scenic quality from deterioration of the Road, historic features, and natural resources. Once rehabilitation is completed there would be moderate to major, long-term beneficial effects to visual quality along the Road.	Similar to Alternative 1, but repairs would be implemented sooner. Moderate to major long-term effects are possible if further Road deterioration occurs.	Similar to Alternative 2, but a reduction in the duration of visual intrusions caused by prior Road damage, and a decrease in the likelihood of future damage. Minor long-term adverse impacts from introduction of new visitor improvements such as slow-moving pullouts, short trails, transit staging, and new pullouts. Minor long-term beneficial effects from rehabilitation of social trails and improvements to pullout configuration.	Similar to Alternative 3, with beneficial improvements implemented 1 to 2 years sooner and with slightly greater visual effect with a larger transit parking area near Apgar.
NATURAL SOUNDSCAPE AND LIGHTSCAPE	Minor to moderate short-term increases in noise during rehabilitation may disturb wildlife and visitors. Introduction of artificial lighting for night construction is possible for emergency repairs and would have a minor to moderate short-term effect on the night sky.	Similar to Alternative 1, although additional construction sites would increase noise, and night construction may occur. Effects would be minor and short term.	Similar to Alternative 2, with additional construction sites and noise and planned night construction. Effects would be minor to moderate and short term on wildlife and visitors.	Same as Alternative 3.
WILDERNESS AND WILD AND SCENIC RIVERS	No direct disturbance. Noise from construction activity would have a negligible to minor short-term effect on proposed wilderness values. Negligible short-term effects to the values for which the Middle Fork of the Flathead River was designated wild and scenic.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.